F&eIT Series

F&eIT Series Micro Controller Unit
(2GB CF, XP Embedded Model)

CPU-SB303-FIT-3F
CPU-SB304-FIT-45F

(OS Uninstalled Model)

CPU-SB303-FIT
CPU-SB304-FIT-400

User's Manual

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

The product consists of the items listed below.

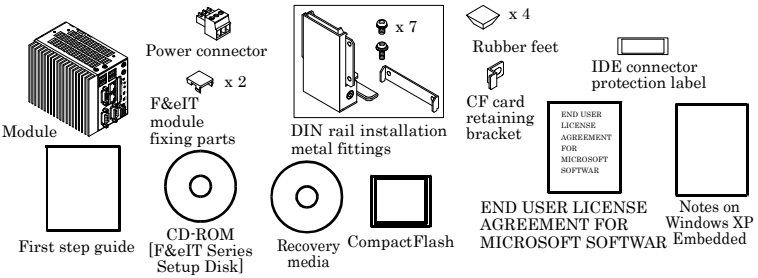
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List	CPU-SB303-FIT-3F CPU-SB304-FIT-45F (2GB CF, XP Embedded Model)	CPU-SB303-FIT CPU-SB304-FIT-400 (OS Uninstalled Model)
Name	Pcs.	Pcs.
Module	1	1
First step guide	1	1
Power connector	1	1
F&eIT module fixing parts	2	2
DIN rail installation metal fittings	1 set	1 set
CD-ROM [F&eIT Series Setup Disk] *1	1	1
Rubber feet	4	4
CF Card Retaining Bracket	1	1
IDE connector protective label	1	1
CompactFlash with Windows XP Embedded installed *1	1	None
END USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE(Windows XP Embedded License Agreement)	1	None
Recovery media	1	None
Notes on Windows XP Embedded	1	None

*1： The CD-ROM contains various software and User's Manual (this manual).

*2： It is attached to CPU-SB304-FIT-45F/CPU-SB304-FIT-400.

- Configuration images



⚠ CAUTION

For operating this product, power supply (12 - 24VDC) is required separately.

For more details on the power supply, refer to "Chapter5 Specifications - About power supply".

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1. Before Using the Product

This section explains information you need to know about this product before you use it.

About the Module

Operated by an OS such as Windows XP, this microcontroller unit can be used as a general-purpose PC or a controller for a measurement/control/communication device from CONTEC F&eIT Series.

CPU-SB303 Series contains a power-saving high-performance Celeron (R) M processor 800MHz, 852GM chip set, 512MB of DDR SDRAM memory and communication interfaces such as USB2.0 and 1000BASE-T.

CPU-SB304 Series contains a power-saving high-performance Celeron (R) M processor 1GHz, 852GM chip set, 512MB of DDR SDRAM memory and communication interfaces such as USB2.0 and 1000BASE-T.

The adoption of a heat sink provides a completely naturally air-conditioned (fanless) environment.

These products enable functional expansion when an F&eIT Series device is stack-connected to the F&eIT I/F.

This product is faster (processing speed: approx. 6 times faster (CPU-SB304 : approx. eight times faster)) and functionally more advanced (USB2.0, RS-232C and LAN: doubled) than the previous CPU-SB20 Series products.

For more details on the differences from the conventional products, refer to “Chapter6 Differences from CPU-SB20/xxx(FIT)GY”.

- Base model

  CPU-SB303-FIT, CPU-SB304-FIT-400 : (Memory 512MB, model without OS, CF)

OS pre-installed model

  CPU-SB303-FIT-3F, CPU-SB304-FIT-45F : (Memory 512MB, model with Windows XP Embedded, CF 2GB)

Features

- Fits a PC with expansion capability into a small size (94.0(W) x 120.0(D) x 74.7(H)).

Encased in a compact cabinet (94.0(W) x 120.0(D) x 74.7(H)), this product has a range of interfaces such as VGA, USB2.0 x 4, RS-232C x 2, LAN x 2 (1000BASE-T, 100BASE-TX), audio and F&eIT I/F (for F&eIT Series device modules). This product also has the Secondary IDE Connector that can be connected to an external CD-ROM/DVD-ROM drive.

- Ultra-low voltage Celeron M 800MHz, 852GM chip set, and 512MB of memory (CPU-SB303-FIT, CPU-SB303-FIT-3F)

The product has a power-saving, high-performance, ultra-low voltage Intel (R) Celeron (R) M processor with 800MHz (FSB: 400MHz), Intel (R) 852GM chip set, and 512MB of memory.
It is a faster and functionally more advanced model than the previous CPU-SB20 Series products, with approximately 6-time faster processing speed.

- Ultra-low voltage Celeron M 1GHz, 852GM chip set, and 512MB of memory (CPU-SB304-FIT-400, CPU-SB304-FIT-45F)

The product has a power-saving, high-performance, ultra-low voltage Intel (R) Celeron (R) M processor with 1GHz (FSB: 400MHz), Intel (R) 852GM chip set, and 512MB of memory.
It is a faster and functionally more advanced model than the previous CPU-SB20 Series products, with approximately 8-time faster processing speed.

- The adoption of a fan-less, CF card configuration providing high levels of reliability and quietness

The adoption of a heat sink provides a fanless environment, while the use of a CF card as a storage device ensures high levels of reliability and quietness. In addition, from a full consideration of safety, the CF card slot comes with a metal bracket to prevent the card from being accidentally disconnected.

- A wide range of power supplies (12 - 24VDC) supported

Supporting a wide range of power supplies (12 - 24VDC), the product can be used under various power conditions.

- It is possible to operate by OS such as Windows XP. (CPU-SB303-FIT, CPU-SB304-FIT-400)

This product supports a variety of applications as a compact embedded controller based on Microsoft Windows XP Professional, Embedded, Windows 2000, Linux and PC-DOS.

- Possibly used as a controller for a measurement/control/communication device from the F&eIT Series

This product can be used as a controller for a measurement/control/communication device from the F&eIT Series.
The measurement/control/communication devices which can be used include digital I/O, analog I/O and serial communication modules.

- Up to eight F&eIT Series device modules can be connected to the F&eIT I/F

The F&eIT I/F can accommodate up to eight F&eIT Series device modules (maximum total current of each module is 3A or less).

- Possibly installed in 35mmDIN rail

A detachable metal installation part for attaching the main unit to a 35mm DIN rail is bundled by default, which can be used according to the installation conditions. The system features a unique configuration for its connection to a module on the side in a stacking manner, which allows you to configure the system simply and elegantly without using backplanes and other connecting devices.

Verified Operating Systems

Operating system for which the CPU-SB303-FIT, CPU-SB304-FIT-400 (Model which has no OS) operation has been confirmed is as follows.

- Microsoft Windows XP Professional, Embedded
- Microsoft Windows 2000 Professional
- IBM PC-DOS 2000 Ver.7.0
- TurboLinux 10 Server (Linux 2.6.8-1 kernel)

* Verified Operating Systems : Basic OS operation and VGA, LAN and sound driver operation has been confirmed. CONTEC does not guarantee that all OS functions will operate correctly.

* You can build a Windows XP or Windows 2000 SP3/SP4 environment on the CPU-SB303-FIT, CPU-SB304-FIT-400 by installing the OS using a retail USB-based CD-ROM drive or FDD. You can also install another OS such as DOS if you prepare a retail USB CD-ROM drive supported by a startup disk for the OS.

⚠ CAUTION

It is not possible to operate by Microsoft Windows 2000 Professional in enhancement odule SMC-2DL-FIT.

Support Software

You should use CONTEC support software according to your purpose and development environment.

Driver library **API-SBP(W32)** (Available for downloading (free of charge) from the CONTEC web site.)

The CPU-SB30Series is the Windows version driver library software that provides products in the form of Win32 API functions (DLL). Various programming languages such as Visual Basic and Visual C++ can be used to create high-speed application software which maximizes the features of the F&eIT module. In addition, a diagnostic program, which is useful for operation verification, is also provided.

< Operating environment >

OS	Windows XP, 2000, Me, 98, etc..
Adaptation language	Visual C++, Visual Basic, etc..

You can download the updated version from the CONTEC's Web site (http://www.contec.com/fit/page5.htm). For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

List of Options

CF Card (CPU-SB303-FIT, CPU-SB304-FIT-400)

- CF-1GB-A 1GB CompactFlash for Fix Disk
- CF-2GB-A 2GB CompactFlash for Fix Disk
- CF-4GB-A 4GB CompactFlash for Fix Disk
- CF-8GB-A 8GB CompactFlash for Fix Disk

CD-ROM/DVD-ROM drive

- IPC-CDD-03 CD-ROM/DVD-ROM drive *1
- IPC-CDC-03 Connection cable for CD-ROM/DVD drive (400mm)

*1 Please purchase the optional connection cable [IPC-CDC-03].

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably. No driver software is provided with this module. Please download the latest drivers from the CONTEC web site (http://www.contec.com/). Documents including important notes on the use of the module are also posted on the web site. Please visit the CONTEC web site before using the module.

Web Site

Japanese http://www.contec.co.jp/
English http://www.contec.com/
Chinese http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.
Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.
This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original modules. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Handling Precautions

⚠ DANGER

Please do not use the product in environments subject to flammable and corrosive gas. Otherwise, it can bring on exploding, fire, electric shock and trouble.

⚠ CAUTION

- Do not use or store the equipment in a hot or cold place, or a place that is subject to severe temperature changes.
  Examples: - Under direct sunlight
  - Near a heat source
- Do not use or store the equipment in a place that is subject to extreme humidity or dust. It will be extremely dangerous to use the equipment when its interior is contaminated with water or liquid, or conducting debris. When using the equipment in an environment that is subject to water or conducting debris, consideration should be given to the installation of a control panel with a structure that keeps dust out.
- Do not use or store the equipment in a place that is subject to shock or vibrations.
- Do not use or store the product near equipment generating a strong magnetic field or radio waves. It may cause malfunction.
- Do not use or store the equipment in air with diffused chemicals or in an environment in which the equipment can come into contact with chemicals.
- When attaching or detaching a module or a connector, please be sure that the power cable for the system is unplugged from the outlet.
- Do not modify this product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.

- If you notice any malfunction or abnormal conditions (such or a strange odor or overheating), please unplug the power cord and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- To clean this product, gently wipe it with a soft cloth soaked with water or a neutral detergent. Do not use benzene, a thinner, or other volatile solvents as they can cause the coating to discolor or peel off.
- Life of the components

  Battery ... A primary lithium battery is used to back up the internal clock/calendar and the CMOS RAM. When the power is not drawn and the battery is stored at 25°C, it will last over 10 years. For changing a battery, contact your retailer.
- Regarding “FCC PART 15 Class A Notice”

  The ferrite core must be installed in the following each cable so that this product may suit the above-mentioned standard. Leave "Secondary IDE" pins unconnected.

  CPU-SB303-FIT,CPU-SB303-FIT-3F

Port	Name	Maker	Turn
LAN 100M	E04SR301334	SEIWA	2
LAN 1000M	E04SR301334	SEIWA	2
LINE OUT	E04SR200935A	SEIWA	2
MIC	E04SR200935A	SEIWA	2
POWER	E04SR200935A	SEIWA	1
USB	E04SR301334	SEIWA	3

  CPU-SB304-FIT- 400,CPU-SB304-FIT- 45F

Port	Name	Maker	Turn
LINE OUT	E04SR170730A	SEIWA	4
MIC	E04SR170730A	SEIWA	4
POWER	E04SR401938	SEIWA	4

- Regarding “EMC Instruction Class A Notice”

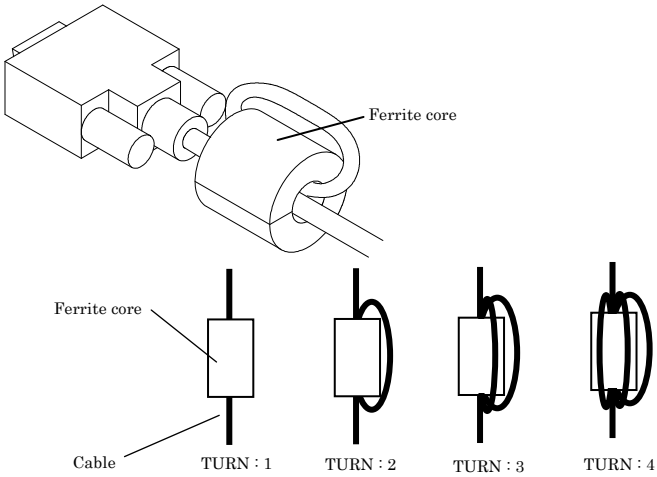
  The ferrite core must be installed in the following each cable so that CPU-SB304-FIT Series may suit the above-mentioned standard. (CPU-SB303-FIT Series does not support the CE standard.)

  Paste the attached IDE connector protective label to the secondary IDE.

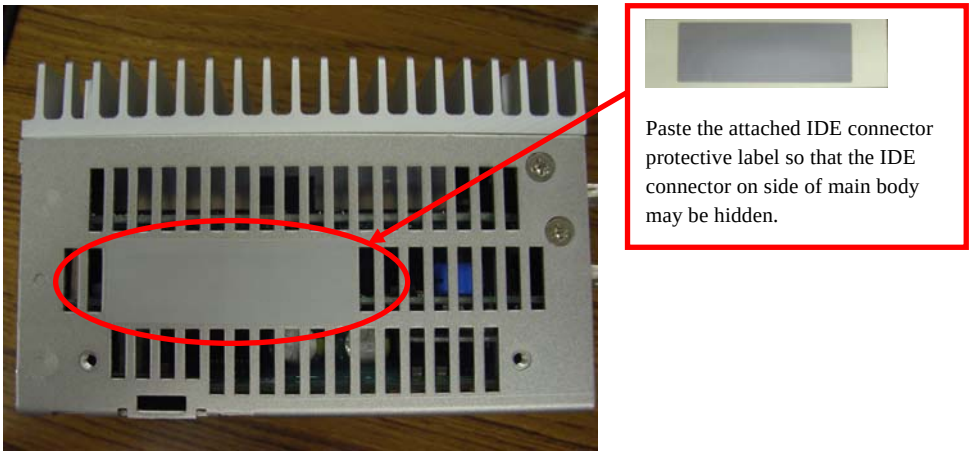
  CPU-SB304-FIT- 400, CPU-SB304-FIT- 45F

Port	Name	Maker	Turn
MONITOR	E04SR170730A	SEIWA	1
MIC	E04SR170730A	SEIWA	4
LINE OUT	E04SR170730A	SEIWA	4
POWER	E04SR401938	SEIWA	4

- Image diagram



Pasting figure of IDE connector protective label



FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

Environment

Use this product in the following environment. If used in an unauthorized environment, the module may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50ºC

Operating humidity

10 - 90%RH (No condensation)

Corrosive gases

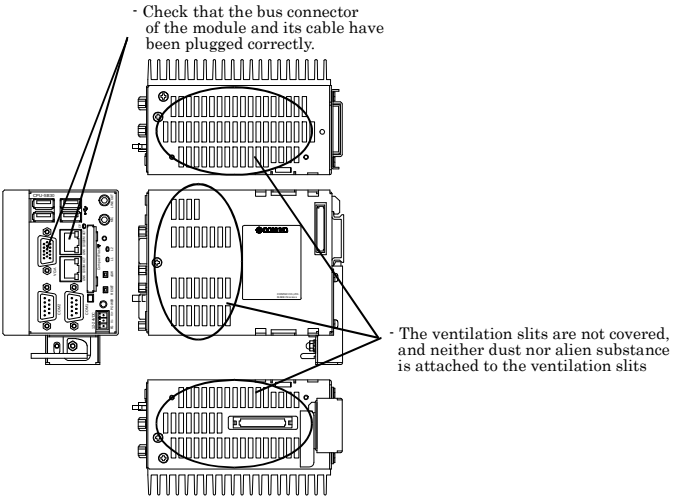
None

Floating dust particles

Not to be excessive

Inspection

Inspect the product periodically as follows to use it safely.


- Check that the bus connector of the module and its cable have been plugged correctly.
- The ventilation slits are not covered, and neither dust nor alien substance is attached to the ventilation slits

Storage

When storing this product, keep it in its original packing form.

(1) Put the module in the storage bag.
(2) Wrap it in the packing material, then put it in the box.
(3) Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

Disposal

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

2. Hardware Setup

Getting Started

Follow the following procedures to set up the CPU-SB30 series :

STEP1 Connecting the F&eIT series module
By referring to this chapter connects the F&eIT series module to the CPU-SB30 series. When using the CPU-SB30 series on a standalone basis, go to STEP2.

STEP2 Connecting the cables
Connect the cables for the CRT and other external devices to the CPU-SB30 series.

STEP3 Turning on the power
After re-checking that STEPS 1 to 2 have been correctly performed, turn on the power. If something goes wrong after the power is turned on, immediately turn off the power and make sure that the system is correctly set up.

Attaching the CF Card Retaining Bracket

(1) After inserting a CF Card, fasten the bundled CF Card retaining bracket with a screw. Use the bracket, especially when any vibration or impact is expected.

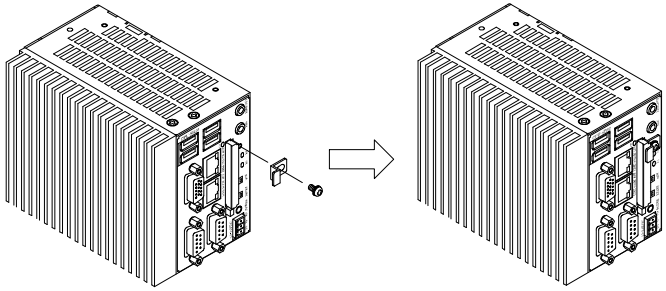


Figure 2.1. Attaching the CF Card Retaining Bracket

Mounting / Removing the Device Module

Stack Connection Locking Devices

This product has two openings (at the top and bottom) to which the locking devices are connected.

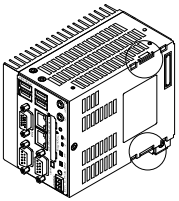


Figure 2.2. Stack connection locking device

Mounting the Device Module

(1) Insert the stack hook by aligning it with the hook insertion inlet for the other device.

(2) Mount the module onto this product, using the bundled F&eIT module fixing parts.
(If a stack connector protective cover is attached, the connection operation should be performed after the cover is removed.)

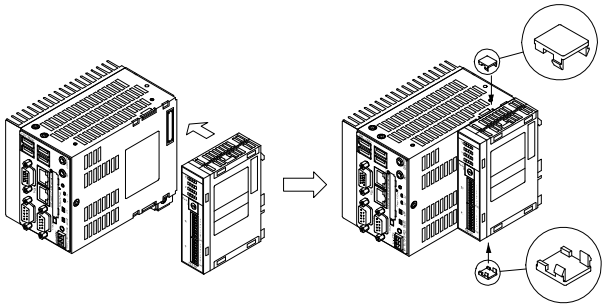


Figure 2.3. Mounting the module

Removing the Module

Remove the F&eIT module fixing parts from the top and bottom to detach the joined modules.

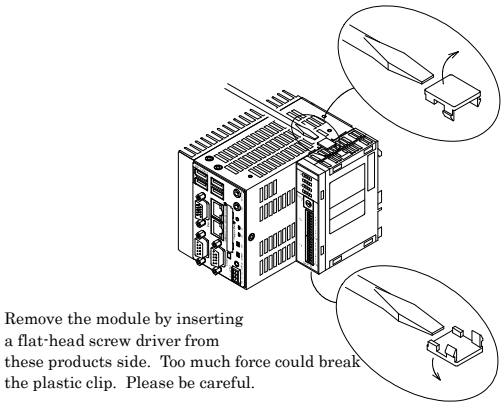

Remove the module by inserting
a flat-head screw driver from
these products side. Too much force could break
the plastic clip. Please be careful.

Figure 2.4. Removing the Module

Mounting on / Removing a DIN Rail

Mounting on a DIN Rail Installation Metal Fittings

Mount the DIN rail installation metal fittings onto the main unit.

(1) Remove the three screws found at the back of the main unit.

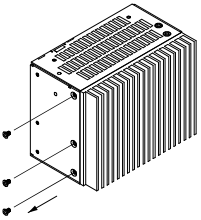


Figure 2.5. Mounting on a DIN Rail Installation Metal Fittings ***< 1 / 3 >***

(2) Mount the bundled DIN rail installation metal fittings with screws.

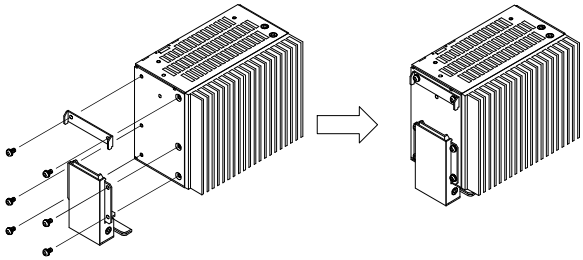


Figure 2.5. Mounting on a DIN Rail Installation Metal Fittings ***< 2 / 3 >***

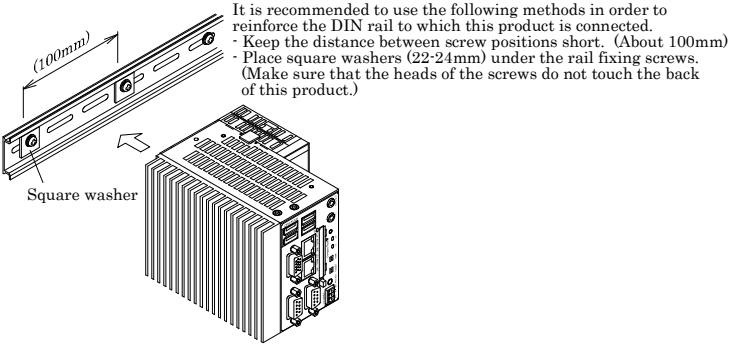

It is recommended to use the following methods in order to reinforce the DIN rail to which this product is connected.
- Keep the distance between screw positions short. (About 100mm)
- Place square washers (22-24mm) under the rail fixing screws. (Make sure that the heads of the screws do not touch the back of this product.)
(100mm)
Square washer

Figure 2.5. Mounting on a DIN Rail Installation Metal Fittings ***< 3 / 3 >***

Mounting on a DIN rail installation metal fittings

(1) Pull down the DIN rail installation metal fitting lever on this product.
If a device module is connected, push the fixing hook up using a slotted screwdriver to make it lockable.
(this should be done on all connected device modules.)

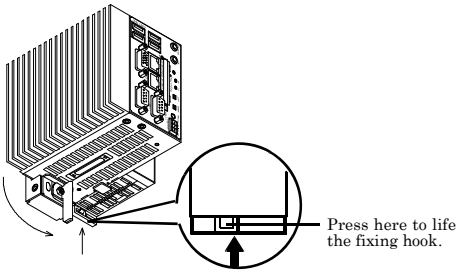


Figure 2.6. Mounting on a DIN rail ***< 1 / 3 >***

(2) Hook the unit (an object consisting of a controller and a module) from the upper part of the DIN rail, and press the lower part of the unit onto the DIN rail.

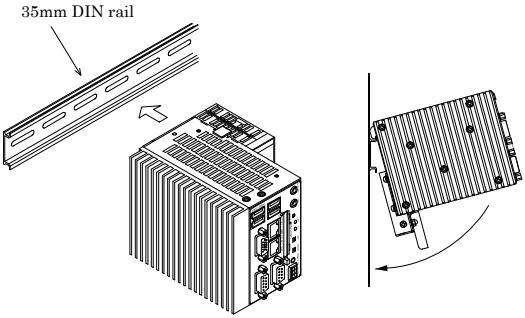


Figure 2.6. Mounting on a DIN rail ***< 2 / 3 >***

(3) Lift up the DIN rail installation fitting lever on this product. Attach the bundled lever fixing screws. If a device module is connected, the fixing hook will be locked automatically; therefore, the device module can be attached with a single motion.

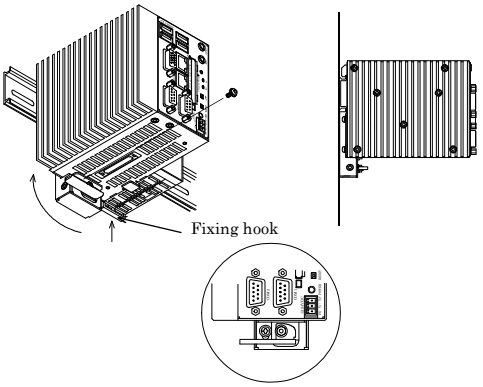


Figure 2.6. Mounting on a DIN rail ***< 3 / 3 >***

Removing from a DIN Rail

⚠ CAUTION

To disconnect any connected device from the other modules, remove all the device modules which are connected to this product, from the DIN rail beforehand.

(1) Remove the lever fixing screws from the DIN rail installation fitting, then pull down the DIN rail installation fitting lever.
If a device module is connected, pull down the fixing hook of the device module to unlock it. (this should be done on all connected device modules.)

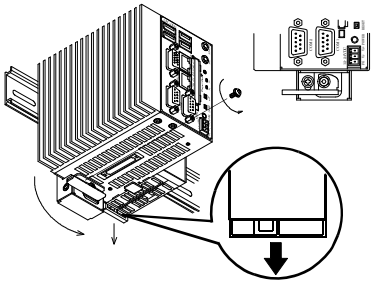


Figure 2.7. Removing the module from the DIN rail ***< 1 / 3 >***

(2) With the fixing hook unlocked, pull the lower part of this product toward you.

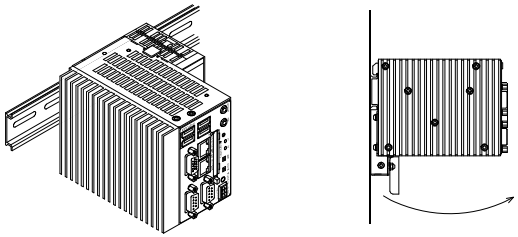


Figure 2.7. Removing the module from the DIN rail ***< 2 / 3 >***

(3) By lifting this product, you can easily remove it from the DIN rail.

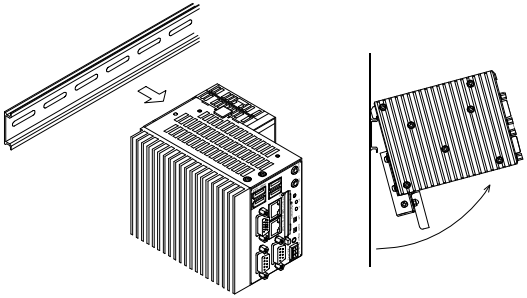


Figure 2.7. Removing the module from the DIN rail ***< 3 / 3 >***

Connection Method

Supplying the Power to the Controller

(1) This product and a power supply unit (about 50W commercial power unit) are connected by using the detachable connector either on the unit or module face.
Use a cable no longer than 40cm (AWG24 - 16). (No longer than 15cm for AWG28 and no longer than 30cm for AWG26).
Compatible cables are AWG28 - 16. Strip the cable jacket off about 7mm. The fastening torque for the cable core should be 0.22 - 0.25Nm.

⚠ CAUTION

The power supply for the device modules connected to the F&eIT I/F is supplied via the stack connector.
For operating this product, power supply (12 - 24VDC) is required separately.
For more details on the power supply, refer to “Chapter5 Specifications - About power supply”.

Installation Conditions

Installation orientation (Floor/desk installation for single use)

The system can be installed in either orientation (1) or (2). Orientation (3) and (4), which does not lend itself to heat dissipation, should be avoided. If using orientation (1), do not connect any other modules. If using orientation (2), other modules may be connected but ensure a clearance on the bottom side of at least 5.8mm by using the bundled rubber feet.

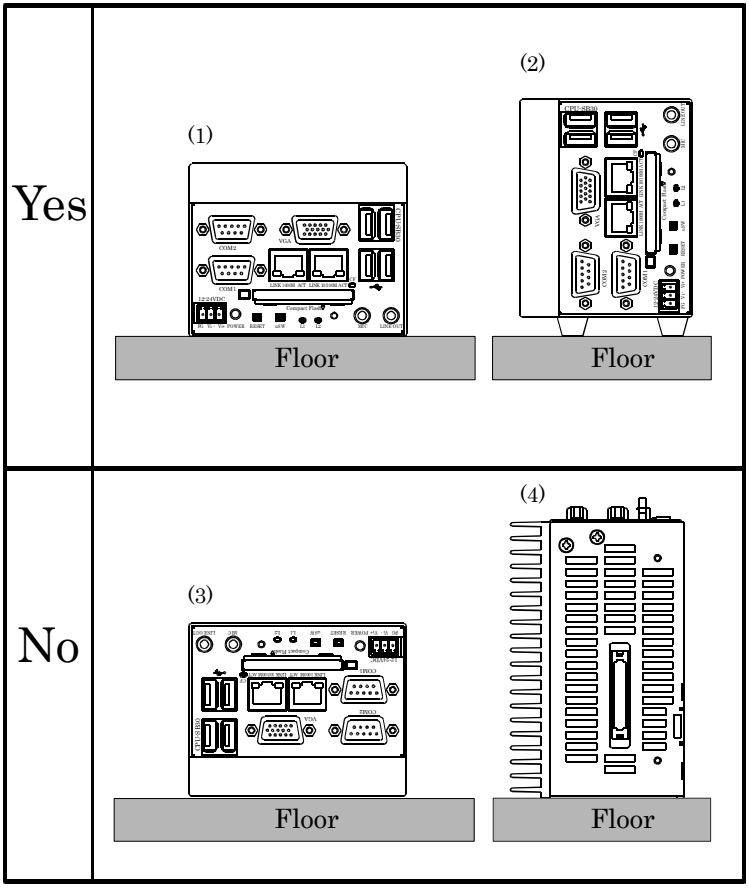


Figure 2.8. Installation orientation (Floor/desk installation for single use)

⚠ CAUTION

If this product is installed with the heat sink side up (direction of (1)), use it in the environment that has cooling air (0.5m/s).

Installation orientation (Wall/ceiling installation for single use)

The system can be installed in either orientation (5). Orientation (6), which does not lend itself to heat dissipation, should be avoided. In orientation (5), the system can be connected to other modules. In that case, however, install it on a DIN rail, leaving 45mm or more underneath.

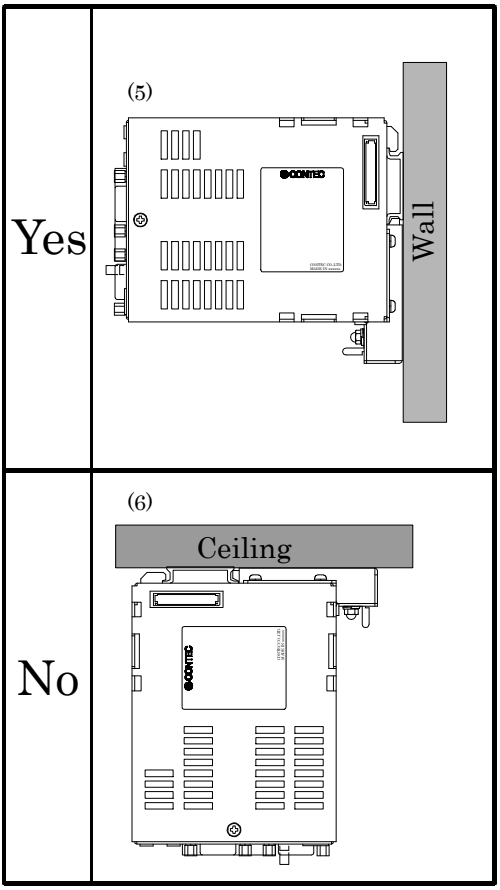


Figure 2.9. Installation orientation (Wall/ceiling installation for single use)

Spacing between the system unit and any surrounding objects

Secure a distance of at least 50mm between the top of the main unit (single use) and any surrounding objects and also a distance of at least 10mm between each side of the unit and any surrounding objects. To place the unit upright, use the bundled rubber feet to secure a distance of at least 5.8mm underneath. If a device module is connected, secure a distance of at least 5.8mm at each side of the device module. Do not locate the module in a fully enclosed housing.
This restriction does not apply if the side of the enclosure has ventilation slits next to the module.

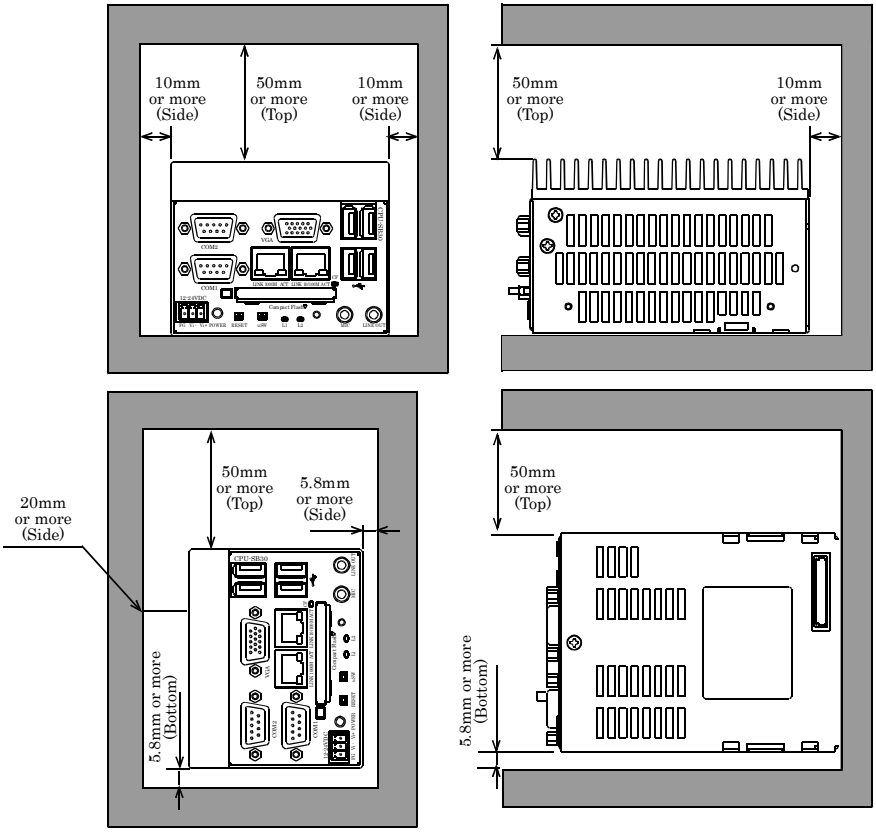


Figure 2.10. Spacing between the module and any surrounding objects *< 1 / 2 >*

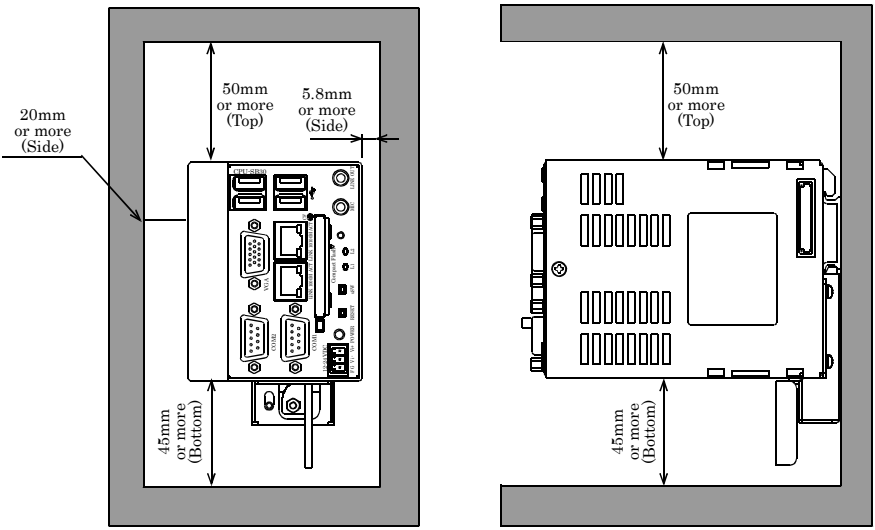


Figure 2.10. Spacing between the module and any surrounding objects *< 2 / 2 >*

3. Functions of the Various Components

Nomenclature

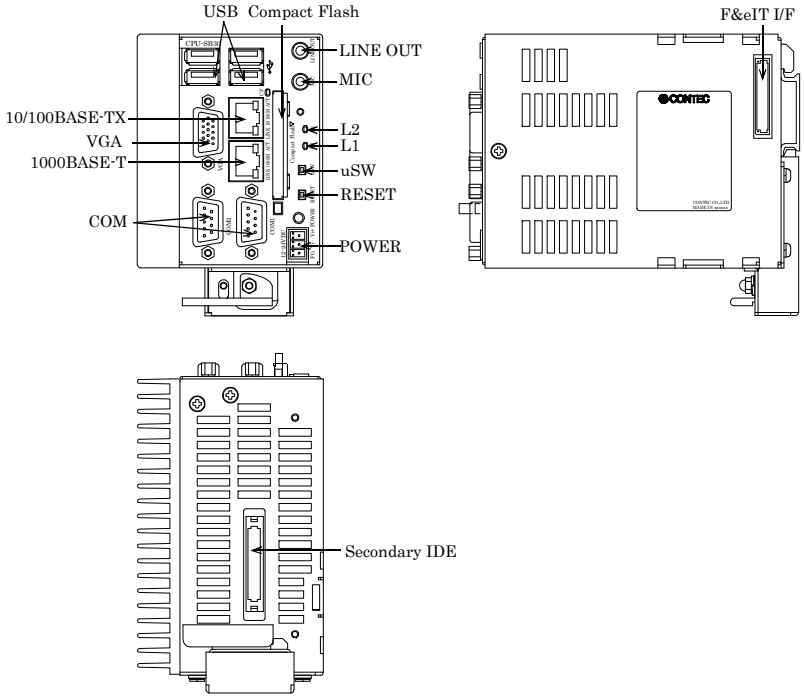


Figure 3.1. Nomenclature

Table 3.1. Functions of the various parts

Name	Function	Page
COM	Serial port connector (D-SUB 9-pin)	25
VGA	CRT connector (HD-SUB 15-pin)	31
CompactFlash	Compact FLASH insertion connector (TYPE 1 or TYPE 2) Any microdrive or CompactFlash that supports True IDE mode can be used.	32
Secondary IDE	Allows the optional CD-ROM/DVD-ROM drive to be connected, if the optional dedicated cable is used.	33
CF LED	Compact FLASH access verification LED	34
POWR LED	Power-up verification LED	34
L1	User Programmable LED1 : The LED can be turned on or off via IO port 8800H[0].	34
L2	User Programmable LED2 : The LED can be turned on or off via IO port 8801H[0].	34
uSW	User Programmable Switch The switch state (on or off) can be read from IO port 8802H[0].	34
RESET SW	Resets the CPU.	34
USB	USB connector (A TYPE USB2.0)	35
LINE OUT	Line out (φ3.5 PHONE JACK)	39
MIC	Microphone input (φ3.5 PHONE JACK)	39
10/100BASE-TX	RJ-45 connector	36
1000BASE-T	RJ-45 connector	37
POWER	Power supply connector (MC1,5/3-G-3,5 PHOENIX CONTACT)	39
F&eIT I/F	F&eIT series connector (0.6mm pitch, 80-pin (FX-8C series, HIROSE))	40

Serial Port Interface

RS-232Cport (COM1, COM2)

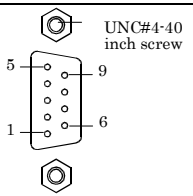
The system is equipped with two RS-232C-compliant serial port connector. This port can be set by means of BIOS setup procedures.

Table 3.2. SERIAL1 I/O address and interrupt (Factory setting)

COM	I/O address	Interrupt
1	3F8h-3FFh	IRQ 4
2	2F8h-2FFh	IRQ 3

Table 3.3. Serial port connector

Connector used	D-SUB 9-pin (MALE)



Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Dataset ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

I/O addresses and commands

The following table shows COM1 addresses and commands :

Table 3.4. I/O addresses

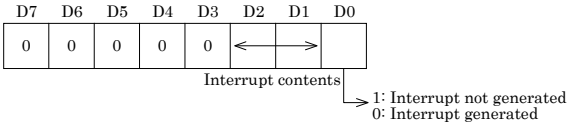
I/O address	DLAB	Read/Write	Register	
03F8h	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9h	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAh	X	R	Interrupt ID register	IIR
03FBh	X	W	Line control register	LCR
03FCh	X	W	Modem control register	MCR
03FDh	X	R	Line status register	LSR
03FEh	X	R	Modem status register	MSR
03FFh	X	R/W	Scratch register	SCR

DLAB (Divisor Latch Access Bit) : value of bit 7 of line control register

Table 3.5. Register functions ***< 1 / 3 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03F8h</td><td>THR: Transmitter Holding Register [DLAB=0]
D7 D6 D5 D4 D3 D2 D1 D0
bit7 MSB ← → bit0 LSB
Transmission data write-only register</td></tr>
<tr><td>03F8h</td><td>RBR: Reciever Buffer Register [DLAB=O]
D7 D6 D5 D4 D3 D2 D1 D0
bit7 MSB ← → bit0 LSB
Received data read-only register</td></tr>
<tr><td>03F8h</td><td>DLL: Divisor Latch (LSB) [DLAB=1]
D7 D6 D5 D4 D3 D2 D1 D0
bit7 MSB ← → bit0 LSB
Baud rate-setting register (LSB)</td></tr>
<tr><td>03F9h</td><td>DLH: Divisor Latch (MSB) [DLAB=1]
D7 D6 D5 D4 D3 D2 D1 D0
bit7 MSB ← → bit0 LSB
Baud rate-setting register (MSB)</td></tr>
<tr><td>03F9h</td><td>IER: Interrupt Enable Register [DLAB=0]
D7 D6 D5 D4 D3 D2 D1 D0
0 0 0 0 EMS ELSI ETHRE ERDAI
ERDAI: Received data Interrupt enabled
ETHRE: Received data register empty Interrupt enabled
ELSI: Receiver line status Interrupt enabled
EMS: Modem status interrupt enabled [Always used at 0.]
1: Interrupt enabled
0: Interrupt disabled</td></tr>
</table>

Table 3.5. Register functions ***< 2 / 3 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAh</td><td>
IIR : Interrupt Identification Register


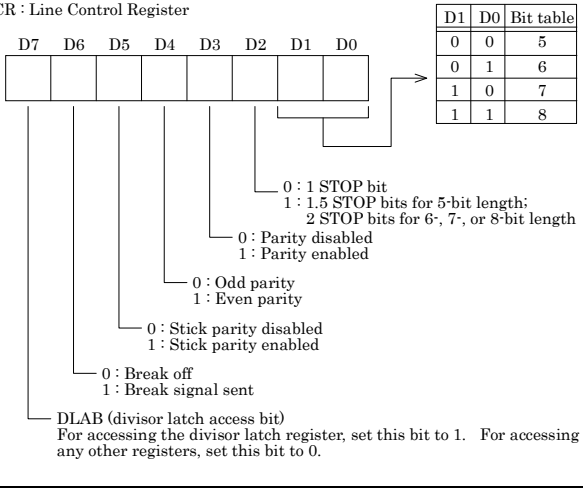
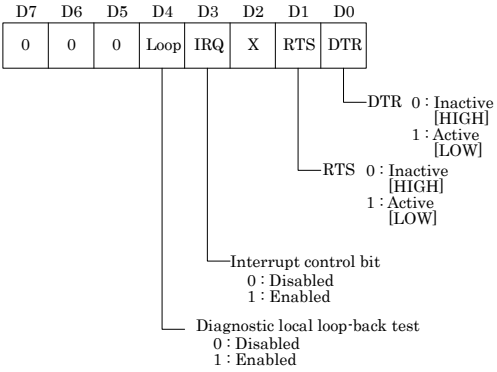
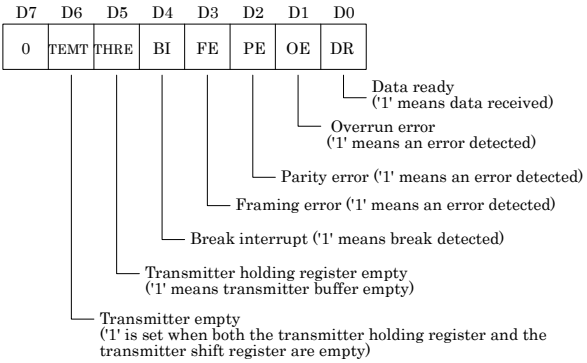
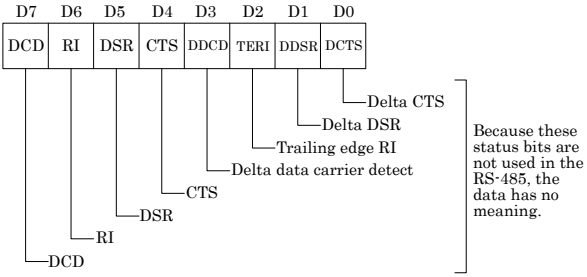
<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>No interrupts generated</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Interrupt generated on overrun, parity, framing error, or break. Interrupt cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Interrupt generated when the receive buffer register is ready. Interrupt cleared when the receive buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Interrupt generated when the transmitter holding register is empty. Interrupt cleared when the IIR is read or transmission data is written to the THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupts generated.(CTS, DSR, RI, CD) Interrupt cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBh</td><td>
LCR : Line Control Register

D7 D6 D5 D4 D3 D2 D1 D0
0 : 1 STOP bit
1 : 1.5 STOP bits for 5-bit length;
2 STOP bits for 6-, 7-, or 8-bit length
0 : Parity disabled
1 : Parity enabled
0 : Odd parity
1 : Even parity
0 : Stick parity disabled
1 : Stick parity enabled
0 : Break off
1 : Break signal sent
DLAB (divisor latch access bit)
For accessing the divisor latch register, set this bit to 1. For accessing any other registers, set this bit to 0.
<table>
<tr><th>D1</th><th>D0</th><th>Bit table</th></tr>
<tr><td>0</td><td>0</td><td>5</td></tr>
<tr><td>0</td><td>1</td><td>6</td></tr>
<tr><td>1</td><td>0</td><td>7</td></tr>
<tr><td>1</td><td>1</td><td>8</td></tr>
</table>
</td></tr>
</table>

Table 3.5. Register functions ***< 3 / 3 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FCh</td><td>MCR: Modem Control Register
 
</td></tr>
<tr><td>03FDh</td><td>LSR: Line Status Register
 
</td></tr>
<tr><td>03FEh</td><td>MSR : Modem Status Register
 
</td></tr>
<tr><td>03FFh</td><td>SCR : Scratchpad Register
This is an 8-bit data-saving register that is user-accessible for read and write operations.</td></tr>
</table>

Setting the Baud rate

Software sets the baud rate by dividing the clock input (1.8432MHz) by an appropriate factor. A baud rate can be set by writing one of the values listed in the table below into the Divisor Latch Register (LSB, MSB):

Table 3.6. Setting the Baud rate

Baud rate to be set	et in divisor register	Error (%)
50	2304	0.16
75	1536	0.16
110	1047	0.19
134 .5	857	0.10
150	768	0.16
300	384	0.16
600	192	0.16
1200	96	0.16
1800	64	0.16
2000	58	0.53
2400	48	0.16
3600	32	0.16
4800	24	0.16
7200	16	0.16
9600	12	0.16
19200	6	0.16
28800	4	0.16
38400	3	0.16
57600	2	0.16
115200	1	0.16

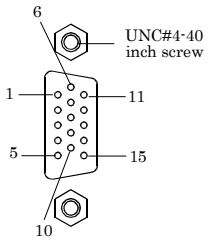
Ex.: For a 9600bps setting, write 00 (dec.) to divisor latch register (MSB), and 12 (dec.) to divisor latch register (LSB).

Display Interface

The system is equipped with a connector for the Display. The name of the connector is VGA(HD-SUB 15P).

Table 3.7. Display Connnector

Connector used	HD-SUB 15-pin (MALE)



Pin No.	Signal name	Pin No.	Signal name
1	RED	9	N.C.
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	N.C.
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	N.C.
8	GND		

Display driver

Install the appropriate audio driver for your OS from the bundled CD-ROM [F&eIT Series Setup Disk]. (For more details on the latest F&eIT Series Setup Disk, check the CONTEC's web site (http://www.contec.com/fit/page7.htm).)

⚠ CAUTION

When the analog display is used, Windows MS-DOS may not be properly displayed in full-screen mode.

This is because the frequency and resolution of Windows and MS-DOS (full-screen display) are the same due to the screen settings while the display parameters are different.

For display, as only one parameter can be stored for one frequency or resolution, only either of Windows or MS-DOS screen can be displayed properly.

In this case, change the resolution or display frequency of Windows so that it is not the same as for the MS-DOS display.

CompactFlash Slot

A CompactFlash compliant card slot is provided. You can use TYPE I or TYPE II memory cards or microdrives that support True IDE mode. Also, you can boot the system from the CompactFlash (hereafter referred to as "CF") by inserting a card containing an operating system (MS-DOS, Windows and Linux, etc). Remember to format the CF before installing the OS. For formatting the CompactFlash card, use a USB-based FDD.

The CPU-SB303-FIT-3F, CPU-SB304-FIT- 45F has a 2-GB CF card plugged in the slot, in which Windows XP Embedded is already installed.

Power supply for the card

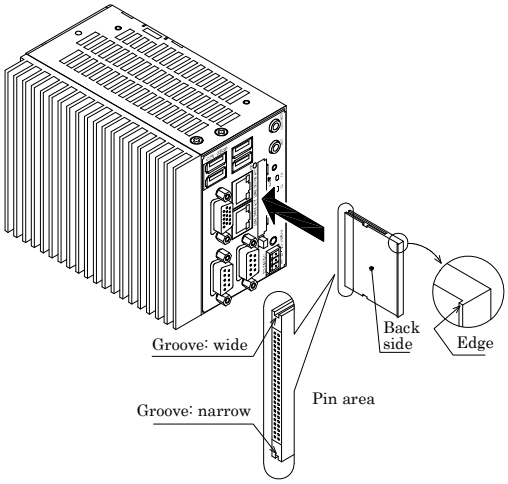
Available card voltages and current values for each slot are listed below :

Table 3.8. Power supply for the card

Voltage	Current (Max)
+5V	Not supplied
+3.3V	500mA
+12V	Not supplied

Orientation of the CF card insertion

When inserting the CF card, direct the backside of the CF card (the side with edge of the card) to [Ethernet connecter] side, and a side with narrow groove to the eject button of the CF slot, then insert.



⚠ CAUTION

- If you feel resistance when inserting the CF card, it could be a wrong insertion. If you further insert forcefully, the CF connector and CF card could be broken.
- When inserting in wrong orientation, the CF connector and CF card could be broken.

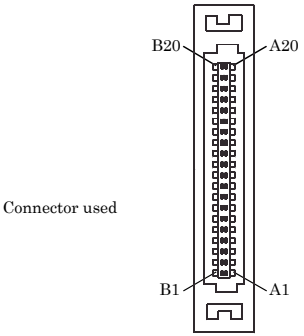
Secondary IDE Connector

This connector allows you to connect the optional CD-ROM/DVD-ROM drive (IPC-CDD-03 to the IDE cable (IPC-CDC-03)) using the cable bundled with the drive.

It does not support connection to any device (hard disk, etc) other than the optional product.

Table 3.9. Secondary IDE Connector

Connector used	40-pin half pitch type (1.27mm pitch)



Pin No.	Signal name	Direction	Pin No.	Signal name	Direction
A1	RESET-	Output	B1	GND	-----
A2	DD7	I/O	B2	DD8	I/O
A3	DD6	I/O	B3	DD9	I/O
A4	DD5	I/O	B4	DD10	I/O
A5	DD4	I/O	B5	DD11	I/O
A6	DD3	I/O	B6	DD12	I/O
A7	DD2	I/O	B7	DD13	I/O
A8	DD1	I/O	B8	DD14	I/O
A9	DD0	I/O	B9	DD15	I/O
A10	GND	-----	B10	N.C.	-----
A11	DDRQ	Input	B11	GND	-----
A12	DIOW-	Output	B12	GND	-----
A13	DIOR-	Output	B13	GND	-----
A14	IOCHRDY	Input	B14	DALE	Output
A15	DDACK-	Output	B15	GND	-----
A16	INTRQ	Input	B16	N.C.	-----
A17	DA1	Output	B17	N.C.	-----
A18	DA0	Output	B18	DA2	Output
A19	CS1-	Output	B19	CS3-	Output
A20	DACT-	Output	B20	GND	-----

CF LED: Red

Illuminates when the CompactFlash is accessed.
Note that there is some variation between the specifications of CompactFlash cards. If you use a card with different specifications, the LED may not illuminate or may remain permanently illuminated.

POWER LED: Green

Illuminates when the power is turned on.

L1: User Programmable LED1 Red

Writing "1" to bit 0 of IO port 8800H illuminates the L1 LED (red). Reading the IO port state is also permitted.

L2: User Programmable LED2 Green

Writing "1" to bit 0 of IO port 8801H illuminates the L2 LED (green). Reading the IO port state is also permitted.

uSW: User Programmable Switch

Reading bit 0 of IO port 8802H indicates the switch state. A value of "1" indicates the switch is pressed and "0" indicates no pressed. This IO port bit is read-only.

RESET SW

Pressing this button triggers a reset.

USB ports

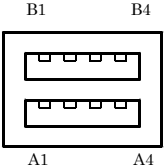
The system is provided with four USB interfaces compliant with the USB 2.0 standard (High/Full/Low Speed).
The power supply capacity for each port is 500mA.
Before connecting a USB device that requires high current consumption to this product, make sure that the current consumption does not exceed the power capacity of the power supply unit to be used.

This product supports the use of a USB-based floppy disk drive (“FDD”), allowing booting of various OS (PC-DOS boot disk, Windows XP/2000 setup boot disk).

Booting from a USB CD-ROM drive is supported.

For details on how to install the OS, refer to the “CPU-SB303-FIT OS installation procedure” in the bundled CD-ROM [F&eIT Series Setup Disk].
For details on the latest “CPU-SB303-FIT OS installation procedure”, visit to the CONTEC web site to download.

Table 3.10. USB connector



Pin No.	Signal name	Pin No.	Signal name
A1	USB0 Vcc	B1	USB1 Vcc
A2	USB0 -Data	B2	USB1 -Data
A3	USB0 +Data	B3	USB1 +Data
A4	USB0 GND	B4	USB1 GND

⚠ CAUTION

Although the USB controller of this product is compliant with the USB 2.0 standard (High/Full/Low Speed), it may not function properly for some USB devices (bus-powered USB hard disk unit, USB card reader, etc.).

Fast-Ethernet

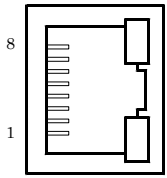
The system is equipped with a Fast-Ethernet.

- Network mode : 10/100BASE-TX
- Transmission rate* : 10M/100Mbps
- Max. network path length : 100m/segment
- Controller : Built-in ICH4 (Intel)

* Operation at 100 Mbps requires a Category 5 cable.

Table 3.11. Ethernet connector

Connector used	RJ-45



Pin No.	Signal	Meamimg
1	TD+	Transmitted data (+)
2	TD-	Transmitted data (-)
3	RD+	Received data (+)
4	N.C.	Not connected
5	N.C.	Not connected
6	RD-	Received data (-)
7	N.C.	Not connected
8	N.C.	Not connected

Network status display LED

LINK : Link status indicator

ACT : Data send/receive indicator

LAN driver

Install the appropriate LAN driver for your OS from the bundled CD-ROM [F&eIT Series Setup Disk]. (For more details on the latest F&eIT Series Setup Disk, check the CONTEC's web site (http://www.contec.com/fit/page7.htm).)

Gigabit-Ethernet

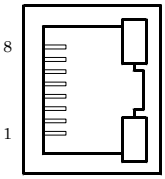
The system is equipped with a Gigabit-Ethernet.

- Network mode : 1000BASE-T
- Transmission rate* : 10M/100M/1000M bps
- Max. network path length : 100m/segment
- Controller : 82541PI(Intel)

* Operation at 100 Mbps requires a Category 5 or more cable.
* Operation at 1000 Mbps requires a Category 5e or more cable.

Table 3.12. Gigabit-Ethernet connector

Connector used	RJ-45



Pin No.	Signal name	Meamimg
1	TRD+(0)	Transmit / receive data 0 (+)
2	TRD-(0)	Transmit / receive data 0 (-)
3	TRD+(1)	Transmit / receive data 1 (+)
4	TRD+(2)	Transmit / receive data 2 (+)
5	TRD-(2)	Transmit / receive data 2 (-)
6	TRD-(1)	Transmit / receive data 1 (-)
7	TRD+(3)	Transmit / receive data 3 (+)
8	TRD-(3)	Transmit / receive data 3 (-)

Network status display LED

LINK : Link status indicator

ACT : Data send/receive indicator

LAN driver

Install the appropriate LAN driver for your OS from the bundled CD-ROM [F&eIT Series Setup Disk]. (For more details on the latest F&eIT Series Setup Disk, check the CONTEC's web site (http://www.contec.com/fit/page7.htm).)

⚠ CAUTION

In case of CPU-SB304, range of operating guarantee temperature is 0 - 35°C when connecting the 1000BASE-T. If you use it in the range of 35 - 50°C, set it to 100BASE-TX or 10BASE-T.

How to set CPU-SB304 as 100BASE-TX or 10BASE-T

Windows XP

(1) Click [Start] button.

(2) Click [Control Panel].

(3) Click [Performance and Maintenance].

(4) Click [System] then [System Properties] window is displayed.

(5) Click [Hardware] then click [Device Manager].

(6) Click '+' in [Network adapters] then double-click 'Intel(R) PRO/1000 MT Network Connection'.

(7) Click [detailed setting] tab then select [Link speed and duplex].

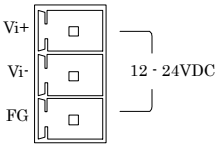
(8) Click [Link Speed] tab and then select one setting from '100Mbps/Full Duplex', '100Mbps/Half Duplex', '10Mbps/Full Duplex', or '10Mbps/Half Duplex' in [Speed and Duplex] which suits the environment for LAN connection.

POWER

This is a power supply connector
- Power supply : 12 - 24VDC±5%

Table 3.13. Power supply connector

Connector used	MC1,5/3-G-3,5(PHOENIX CONTACT)



Pin No.	Signal name	Meaning
1	Vi+	Power supply (12 - 24VDC)
2	Vi-	Power supply (GND)
3	FG	Frame ground

Applicable plug (provided with module) : MC1,5/3-ST-3,5 (Made by PHOENIX CONTACT) (For AWG28 - 16 cable)

The length of cable from the external power supply to the above connector must be no more than 40cm for AWG24 - 16 cable, no more than 15cm for AWG28, and no more than 30cm for AWG26.
When connecting, remove approximately 7mm of insulation from the end of the cable. Apply a conductor tightening torque of 0.22 - 0.25 Nm.

LINE OUT

The audio line OUT output.

Plug type : ϕ3.5 pin jack stereo
Output level : 8Ω 200mW.
Signal to Noise ratio : 90dB.

MIC

The audio MIC Input.

Plug type : ϕ3.5 pin jack

Sound driver

Install the appropriate sound driver for your OS from the bundled CD-ROM [F&eIT Series Setup Disk]. (For more details on the latest F&eIT Series Setup Disk, check the CONTEC's web site (http://www.contec.com/fit/page7.htm).)

F&eIT I/F

This is a F&eIT I/F connector for the F&eIT series connection.

It can connect up to eight device modules.

The maximum power to be supplied to the F&eIT I/F is 3A. Therefore, make sure that the total current consumption of connected modules does not exceed 3A.

Also, I/O addresses 08xxh and 48xxh are not available due to resource restrictions to this product.

When a device module is used with its Device ID as “0” or “4”, the I/O address is 09xxh or 49xxh, respectively.

Table 3.14. F&eIT I/F connector

Connector used	FX8C-80S-SV(HIROSE)

Available connector : FX8C-80P-SV (HIROSE)

⚠ CAUTION

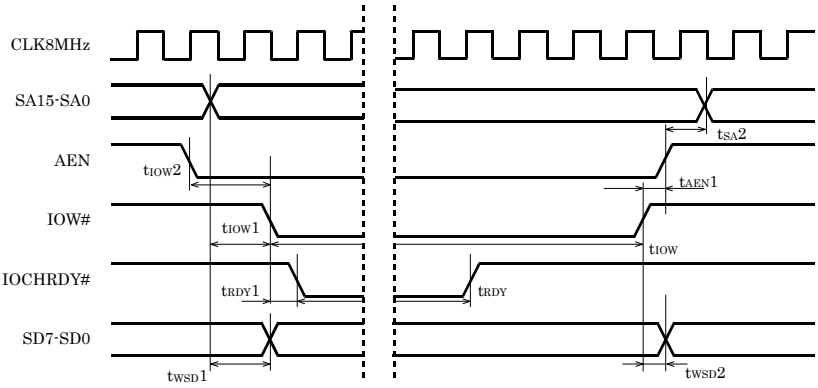
When COM-2(FIT)GY and COM-1PD(FIT)GY are connected to this product by using the CF on Windows, they cannot be used in the enhanced mode with Device ID’s “4” and “5”. To connect three modules, use Device ID’s “6”, “C” and “D”. For the Device ID setting, refer to the device module manual of your own.

Table 3.15. F&eIT I/F pin assignments

No.	Signal	Dir	Description	No.	Signal	Dir	Description
	x86				x86		
A01	FG		Frame ground	B01	FG		Frame ground
A02	N.C.		Not connected	B02	N.C.		Not connected
A03	SA15	OUT	Address bus 15	B03	SA14	OUT	Address bus 14
A04	SA13	OUT	Address bus 13	B04	SA12	OUT	Address bus 12
A05	SA11	OUT	Address bus 11	B05	SA10	OUT	Address bus 10
A06	SA09	OUT	Address bus 09	B06	SA08	OUT	Address bus 08
A07	SA07	OUT	Address bus 07	B07	SA06	OUT	Address bus 06
A08	SA05	OUT	Address bus 05	B08	SA04	OUT	Address bus 04
A09	SA03	OUT	Address bus 03	B09	SA02	OUT	Address bus 02
A10	SA01	OUT	Address bus 01	B10	SA00	OUT	Address bus 00
A11	RESERVED		Reserved	B11	RESERVED		Reserved
A12	RESERVED		Reserved	B12	RST_x86#	IN	CPU reset signal
A13	SD00	IN/OUT	Data bus 00	B13	SD01	IN/OUT	Data bus 01
A14	SD02	IN/OUT	Data bus 02	B14	SD03	IN/OUT	Data bus 03
A15	SD04	IN/OUT	Data bus 04	B15	SD05	IN/OUT	Data bus 05
A16	SD06	IN/OUT	Data bus 06	B16	SD07	IN/OUT	Data bus 07
A17	SD08	IN/OUT	Data bus 08	B17	SD09	IN/OUT	Data bus 09
A18	SD10	IN/OUT	Data bus 10	B18	SD11	IN/OUT	Data bus 11
A19	SD12	IN/OUT	Data bus 12	B19	SD13	IN/OUT	Data bus 13
A20	SD14	IN/OUT	Data bus 14	B20	SD15	IN/OUT	Data bus 15
A21	GND		Ground	B21	GND		Ground
A22	AEN	OUT	Address enable signal	B22	IOCHCK#	IN	NMI signal
A23	IOR#	OUT	Read signal	B23	IRQ7	IN	Interrupt signal
A24	IOW#	OUT	Write signal	B24	IRQ5	IN	Interrupt signal
A25	GND		Ground	B25	GND		Ground
A26	CLK8MHz	OUT	Bus clock	B26	IO_RST#	OUT	Reset signal
A27	GND		Ground	B27	CPUSEN	OUT	CPU ID
A28	IOCHRDY#	IN/OUT	Wait signal	B28	GND		Ground
A29	GND		Ground	B29	GND		Ground
A30	RESETDRV		ISA RESETDRV signal	B30	RESERVED		Reserved
A31	IRQ9	IN	Interrupt signal	B31	RESERVED		Reserved
A32	RESERVED		Reserved	B32	RESERVED		Reserved
A33	SBHE	IN/OUT	ISA SBHE signal	B33	IOCS16#	IN	ISA IOCS16 signal
A34	RESERVED		Reserved	B34	RESERVED		Reserved
A35	RESERVED		Reserved	B35	RESERVED		Reserved
A36	RESERVED		Reserved	B36	RESERVED		Reserved
A37	VCC		+5.0V power supply	B37	VCC		+5.0V power supply
A38	VCC		+5.0V power supply	B38	VCC		+5.0V power supply
A39	VCC		+5.0V power supply	B39	VCC		+5.0V power supply
A40	VCC		+5.0V power supply	B40	VCC		+5.0V power supply

Remarks)

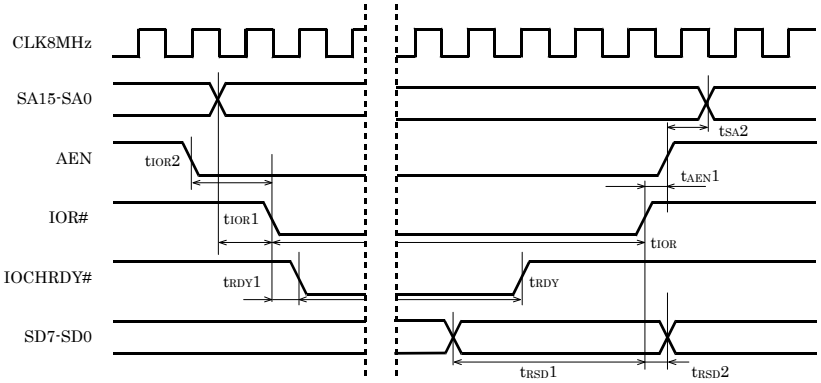
The symbol "#" at the end of an item represents negative logic. In an I/O module, normally a pin is reset by using pin B26 IO_RST#. The signal B27 CPUSEN indicates a Low level output. The IRQx signal represents a signal for which the rise edge is enabled. Total power ratings for the power supply pins: 5.0VDC, 3.0A.



[ns]

Item	Code	Min.	Max.
Address delay time	tSA2	0	-
AEN delay time 1	tAEN2	30	-
IOW# delay time 2	tIOW2	100	-
IOW# delay time 1	tIOW1	100	-
IOW# pulse width	tIOW	16bit-225 8bit-520	-
IOCHRDY# delay time	tRDY1	-	16bit-75 8bit-360
IOCHRDY# pulse width	tRDY	125	15600
Data delay time	tWSD1	16bit-123 8bit-140	-
Data hold time	tWSD2	45	-

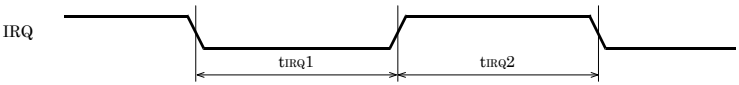
Figure 3.2. F&eIT I/F I/O write cycle



[ns]

Item	Code	Min.	Max.
Address delay time	tSA2	0	-
AEN delay time 1	tAEN1	30	-
IOW# delay time 2	tIOR2	100	-
IOW# delay time 1	tIOR1	100	-
IOW# pulse width	tIOR	16bit-160 8bit-520	-
IOCHRDY# delay time	tRDY1	-	16bit-75 8bit-360
IOCHRDY# pulse width	tRDY	125	15600
Data setup time	tRSD1	24	-
Data hold time	tRSD2	45	-

Figure 3.3. F&eIT I/F I/O read cycle



Item	Code	Min.	Max.
Recovery time	tIRQ2	125	-
Data hold time	tIRQ2	*1	*1

*1： High level must be maintained until the completion of interrupt processing.

Figure 3.4. F&eIT I/F interrupt cycle

4. BIOS Setup

BIOS Setup

BIOS setup sets various settings during startup. When using the system for the first time, be sure to run BIOS setup. Once set up, the specified details will be backed up.
This chapter describes the setup utility built into BIOS.
The BIOS setup screen allows you to set the time, specify the boot device and make hardware settings such as settings for COM and other embedded devices.

⚠ CAUTION

- To restore the default settings, press <F9> on the setup screen.
- Please note that set data might not be maintained in the state that the board is not built into the system case while transporting it though set data in CMOS is backed up with the battery.

Starting the Setup Screen

To start the PhoenixBIOS Setup utility:
Turn on or reboot your system. PhoenixBIOS displays this message:
Press <F2> to enter SETUP
Pressing <F2> displays the Main Menu, which looks like this:

Main Menu

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
System Time:	HH: MM : SS						
System Date:	MM / DD / YYYY						*1
> Primary Master	[Auto] *2						
> Primary Slave	[Auto]						
> Secondary Master	[Auto]						
> Secondary Slave	[Auto]						
System Memory	XxxKB						
Extended Memory	XxxxxKB						
(General key operation help)							

*1 It shows Item Specific Help, if the item has a help information.

*2 The ">" mark indicates it has a submenu.

Figure 4.1. Main Manu Window (Factory Settings)

Keystrokes

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The chart on the following page describes the legend keys and their alternates:

Key	Function
<F1> or <Alt-H>	General Help window (See below).
<Esc>	Exit this menu.
← or → arrow keys	Select a different menu.
↑ or ↓ arrow keys	Move cursor up and down.
<Tab> or <Shift-Tab>	Cycle cursor up and down.
<Home> or <End>	Move cursor to top or bottom of window.
<PgUp> or <PgDn>	Move cursor to next or previous page.
<F5> or <->	Select the Previous Value for the field.
<F6> or <+> or <Space>	Select the Next Value for the field.
<F9>	Load the Default Configuration values for this menu.
<F10>	Load the Previous Configuration values for this menu.
<Enter>	Execute Command or Select P Submenu.
<Alt-R>	Refresh screen.

You can make the following selections on the Main Menu itself. Use the sub menus for other selections.

Feature	Options	Description
System Time	HH:MM:SS	Set the system time.
System Date	MM/DD/YYYY	Set the system date.
Primary Master	This field is set to [AUTO] by default. You can leave it intact for normal use.	Set to the type of the drive on primary IDE master.
Primary Slave		Set to the type of the drive on primary IDE master. *1
Secondary Master		Set to the type of the drive on primary IDE master.
Secondary Slave		Set to the type of the drive on primary IDE master. *2
System Memory	N/A	Displays amount of conventional memory detected during boot up.
Extended Memory	N/A	Displays the amount of extended memory detected during boot up.

*1 No drive can be connected to the Primary Slave.

*2 Please do not connect it of the slave alone.

You can set the boot sequence of the bootable drives by selecting the Boot Sequence from the main menu or opening the Boot Menu.

Primary/Secondary Master, Slave

The Primary/Secondary Master and Slave sub-menus accessed from the Main Menu control these types of devices:

Hard-disk drives

- CF, Microdrive
- CD-ROM drives

This product supports IDE port for both primary and secondary.
As the CF slot is assigned to the Primary Master, no drive can be connected to the Primary Slave.
Each IDE port supports Master drives and optional Slave drives in one of the following combinations :

- 1 Master
- 2 Master
- 2 Master, 1 Slave

⚠ CAUTION

Change this setting, only when an IDE drive which cannot be successfully set by the AUTO setting (e.g. an old model that does not support automatic setting) is installed.

Advanced Menu

This chapter allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

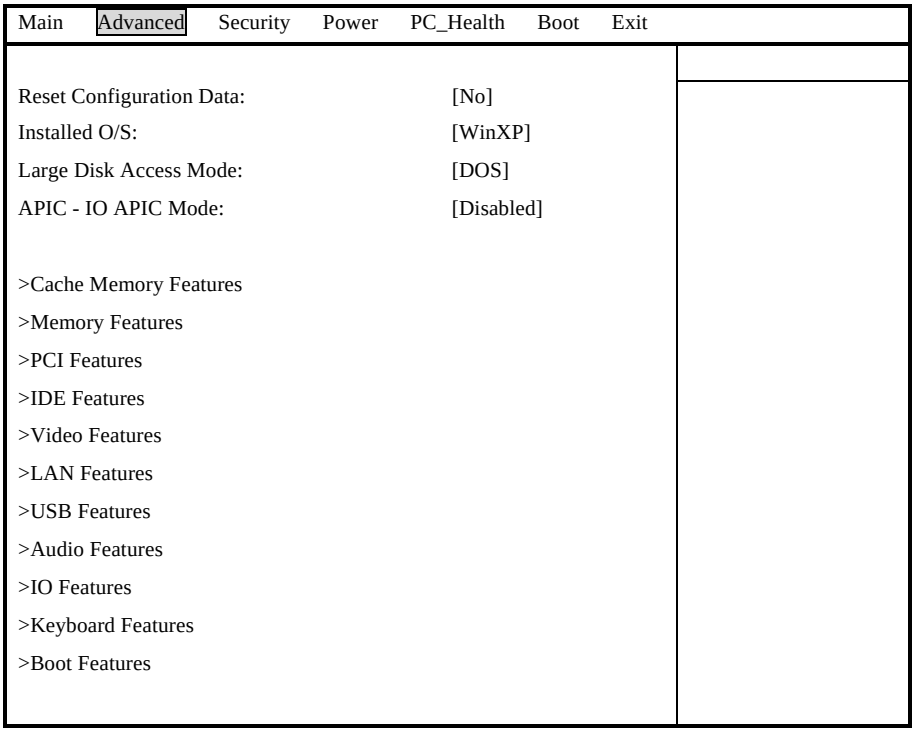


Figure 4.2. Advanced Menu Window (Factory Settings)

Reset Configuration Data

Please use it with No usually. There is a trouble such as OS's being not able to start with the device newly added to the system and to make it reset system configuration data (ESCD) and restructure, make it to Yes. After resetting, it automatically returns to No.

Installed O/S

The operating system most frequently used is selected.

Large Disk Access Mode

Normally, set to "DOS".

APIC - IO APIC Mode

Enable or disable the APIC operation. If you change the setting, note that you have to reinstall the OS.

Be sure to use it in “Disabled” in case of the XP Embedded CPU-SB303-FIT-36 and CPU-SB304-FIT-456.

APIC - IO APIC Mode setting is corresponding to the BIOS Ver.1.21 or later.

Cache Memory Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit

Cache Memory Features	
Memory Cache:	[Enabled]
Cache System BIOS area:	[Write Protect]
Cache Video BIOS area:	[Write Protect]
Cache BASE 0-512k:	[Write Back]
Cache BASE 512k-640k:	[Write Back]
Cache Extended Memory area:	[Write Back]
Cache A000 - AFFF:	[Disabled]
Cache B000 - BFFF:	[Disabled]
Cache C800 - CBFF:	[Write Protect]
Cache CC00 - CFFF:	[Write Protect]
Cache D000 - D3FF:	[Disabled]
Cache D400 - D7FF:	[Disabled]
Cache D800 - DBFF:	[Disabled]
Cache DC00 - DFFF:	[Disabled]
Cache E000 - E3FF:	[Disabled]
Cache E400 - E7FF:	[Write Protect]
Cache E800 - EBFF:	[Write Protect]
Cache EC00 - EFFF:	[Write Protect]

Figure 4.3. Cache Memory Features Window (Factory Settings)

Please use it basically by the default setting.

Cache System BIOS:

System BIOS is cached and the performance is improved.

Cache Video BIOS:

Video BIOS is cached and the performance is improved.

Memory Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit
Memory Features						
Enable memory gap:		[Disabled]				

Figure 4.4. Memory Features Window (Factory Settings)

Please use basically with default setting.

Feature	Options	Description
Enable memory gap	Disabled Enabled	If enabled, turn system RAM off to free address space for use with an option board. Either a 128K conventional memory gap starting at 512KB, or a 1MB extended memory gap, starting at 15MB, will be created in system RAM.

PCI Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit
PCI Features						
> PCI IRQ						

Figure 4.5. PCI Features Window (Factory Settings)

Please use it basically by the default setting.

PCI IRQ

Displays the PCI IRQ setup submenu. You can assign IRQs to individual PCI IRQ lines. All PCI slots are connected to IRQ10 by default. However, this setting is set to “Disabled” and IRQ is allocated against the PCI device when you set the APIC - IO APIC Mode to “Enabled” in the “Advanced Menu”.

IDE Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
IDE Features							
IDE - Device 31, Function 1:			[Enabled]				
Local Bus IDE adapter:			[Both]				
Hard Disk Pre-Delay:			[Disabled]				
SMART Device Monitoring:			[Enabled]				

Figure 4.6. IDE Features Window (Factory Settings)

Please use basically with default setting.

Feature	Options	Description
IDE - Device 31, Function 1	Disabled Enabled	Enable or Disable the IDE Controller.
Local Bus IDE adapter	Disabled Enabled Primary Both	The IDE channels setting.
Hard Disk Pre-Delay	Disabled 3 seconds 6 seconds 9 seconds 12 seconds 15 seconds 18 seconds 21 seconds 30 seconds	Adds a delay before the first access of a hard disk by the BIOS. Some hard disks hang if accessed before they have initialized themselves. This delay ensures the hard disk has initialized after power up, prior to being accessed.
SMART device monitoring	Disabled Enabled	Turn on Self-Monitoring Analysis-Reporting Technology, which monitors condition of the hard drive and reports when a catastrophic IDE failure is about to happen

Video Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit
Video Features						
IGD - Memory Size:		[UMA = 8MB]				
Internal DDC ROM		[Enabled]				
Splash Screen Size		[1024x768]				

Figure 4.7. Video Features Window (Factory Settings)

Please use basically with default setting.

Feature	Options	Description
IGD - Memory Size	UMA = 1M UMA = 8M UMA = 16M UMA = 32M	When Enabled, a fixed VGA frame buffer from A000h - BFFFh and a CPU-to-PCI write buffer are implemented.
Internal DDC ROM	Disabled Enabled	Enables or disables the internal DDC ROM for the CRT interface. When “Enabled”, it reads DDC data from the internal DDC ROM. In normal cases, use it while “Enabled”.
Splash Screen Size	640 x 480 800 x 600 1024 x 768 1280 x 1024	Select the panel device resolution.

LAN Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit
LAN Features						
Internal LAN - Device 8:		[Enabled]				

Figure 4.8. LAN Features Window (Factory Settings)

Please use it basically by the default setting.

Feature	Options	Description
Internal LAN - Device 8	Disabled Enabled	Setting item to “Enabled” will allow the LAN to operate correctly. Setting item to “Disabled” will remove the LAN from PCI configuration space. LAN : 10/100BASE-TX

USB Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
USB Features							
USB - Device 29, F7:			[Enabled]				
Legacy USB Support			[Enabled]				

Figure 4.9. USB Features Window (Factory Settings)

Please use basically with default setting. Use the Legacy USB Support during installation, when necessary. Legacy USB Support setting is supported from BIOS Ver.1.11 and later.

Feature	Options	Description
USB - Device 29, F7	Disabled Enabled	Enabled or disables the USB2.0
Legacy USB Support	Disabled Enabled	Enabled or disables the Legacy USB

Audio Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
Audio Features							
AC97A - Device 31, Function 5:			[Enabled]				

Figure 4.10. Audio Features Window (Factory Settings)

Please use it basically by the default setting.

AC97A - Device 31, Function 5: Enables or disables the chipset Audio device setting.

I/O Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit

IO Features	
Serial port A:	[Enabled]
Base I/O address:	[3F8]
Interrupt:	[IRQ 4]
Serial port B:	[Enabled]
Base I/O address:	[2F8]
Interrupt:	[IRQ 3]

Figure 4.11. IO Features Window (Factory Settings)

The CPU communicates with external devices such as printer through devices called Input/Output (I/O) ports such as serial and parallel ports. Theses I/O devices require the use of system resources such as I/O addresses and interrupt lines. If the devices support Plug and Play, ports can be assigned to them during posting by BIOS as well as the Operating System. If the I/O devices do not support Plug and Play, it may be necessary to set them up manually.

Some systems manage their communication devices using their chipset, while others have separate I/O chips on their CPU board to set and manage such devices.

Use the following chart to configure the Input/Output settings:

Feature	Options	Description
Serial port A: Serial port B:	Disabled Enabled	Disabled turns off the port. Enabled requires you to enter the base Input/Output address and the Interrupt number on the next line. Serial port A:COM1, Serial portB:COM2
Base I/O Address / IRQ	3F8, IRQ4 2F8, IRQ3	When “Enabled” is selected, one of these combinations is selected.

Keyboard Features

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
Keyboard Features							
Keyboard check:			[Disabled]				
Num Lock:			[On]				
Key Click:			[Disabled]				
Keyboard auto-repeat rate:			[30/sec]				
Keyboard auto-repeat delay			[1/2 sec]				

Figure 4.12. Keyboard Features Window (Factory Settings)

Feature	Options	Description
Keyboard check	Disabled Enabled	Booting check the keyboard connection
Num Lock	Auto On Off	On or Off turns NumLock on or off at boot up. Auto turns NumLock on if it finds a numeric key pad.
Key Click	Disabled Enabled	Turns audible key click on.
Keyboard auto repeat rate	30/sec 26.7/sec 21.8/sec 18,5/sec 13.3/sec 10/sec 6/sec 2/sec	Sets the number of times a second to repeat a keystroke when you hold the key down.
Keyboard auto repeat delay	1/4 sec 1/2 sec 3/4 sec 1 sec	Sets the delay time after the key is held down before it begins to repeat the keystroke.

Boot Features

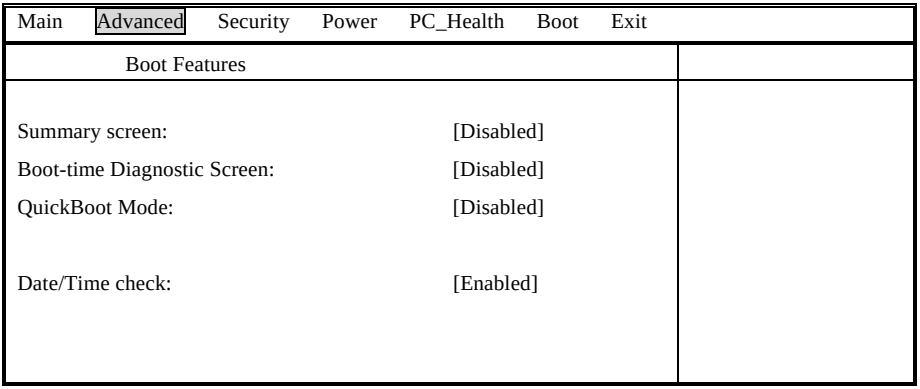


Figure 4.13. Boot Features Window (Factory Settings)

Feature	Options	Description
Summary Screen	Disabled Enabled	Displays system summary screen during boot up.
QuickBoot Mode	Disabled Enabled	Enabled skips some POST tests, speeding boot time
Boot Time diagnostic Screen	Disabled Enabled	Displays Diagnostic Screen during boot up.
Date / Time check	Disabled Enabled	Select to check the RTC Date/Time setting during boot up.

Security Menu

Main	Advanced	Security	Power	PC_Health	Boot	Exit	
Set Supervisor Password			[Enter]				
Set User Password			[Enter]				
Supervisor Password Is:			Clear				
User Password Is:			Clear				
Password on boot:			[Disabled]				
Fixed disk boot sector:			[Normal]				
Diskette access:			[Supervisor]				
Clear All Password:			[Enter]				

Figure 4.14. Security Menu Window (Factory Settings)

Feature	Description
Set supervisor password	You can enter and change the options of the setup menus.
Set user password	Just can only enter but do not have the right to change the options of the setup menus. When you select this unction, the following message will appear at the center of the screen to assist you in creating a password.
Password on boot	The setting whether or not it needs password input in system boot.
Fixed disk boot sector	The write protection setting for the boot sector for hard disk protection from virus.
Diskette access	Protection of password setting of the access for the floppy disk.
Clear all password	It can eliminate all password by the supervisor.
Note: When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration. Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of this board.	

⚠ CAUTION

Once a password is registered, even the password function itself cannot be cancelled without the password. Passwords should be handled with great care.

Power Menu

Main Advanced Security Power PC_Health Boot Exit	
>ACPI Controls	

Figure 4.15. Power Menu Window (Factory Settings)

Feature	Options	Description
ACPI Controls		ACPI detail setting's submenu.

ACPI Controls

Main Advanced Security Power PC_Health Boot Exit	
ACPI Controls	
ACPI S1 State: [Disabled]	

Figure 4.16. Boot Features Window (Factory Settings)

Feature	Options	Description
ACPI S1 State	Disabled Enabled	Enabled or Disabled the stand-by mode.

PC Health Menu

Main Advanced Security Power PC_Health Boot Exit	
>Hardware Monitor Setup	
Thermal_0: 35°C/95°F	
+5V: +5.00 V	
+3.3V: +3.30 V	
VBattery: +3.00V	

Figure 4.17. PC-Health Window

Feature	Description
Hardware Monitor Setup	Warning Temperature settings.
Thermal_0	This field displays the current temperature
+5V / +3.3V / VBattery	These fields display the current voltage of input lines

Hardware Monitor Setup

Main Advanced Security Power C_Health Boot Exit t	
Hardware Monitor Setup	
Warning Temp.(Termal_0): [Disabled]	
Clock Moduration Duty: [Disabled]	

Figure 4.18. Hardware Monitor Setup Window (Factory Settings)

Please use basically with default setting.

Feature	Options	Description
Warning Temp. (Thermal_0)	Disabled 45°C/113°F - 75°C/167°F	Alarm when the temperature increasing.
Clock Moduration Duty	Disabled 12.5% - 87.5%	Lowering the CPU clock decreases the CPU performance to control the heat generated by the CPU.

Boot Menu

After you turn on, it will attempt to load the operating system from the drive of your choice. If it cannot find the operating system on that drive, it will attempt to load it from one or more other drives in the order specified in the Boot Menu.

⚠ CAUTION

When specifying a boot device in the Boot Menu, make sure that the Operating System is installed to the selected device.

In most cases, the Operating System is preinstalled on the hard drive (C:), which is often used as the OS for booting purposes.

To use a different drive as a bootable drive, the OS may need to be installed on the relevant drive.

Selecting "Boot" from the Menu Bar displays the Boot menu, which looks like this :

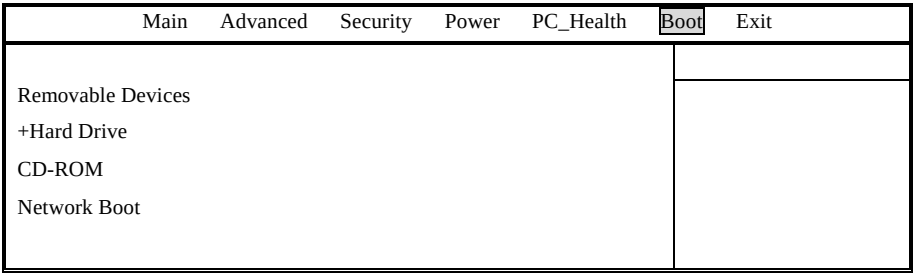


Figure 4.19. Boot Menu Window

You can arrange the boot order list at the top of this menu to specify the order of the devices from which the BIOS will attempt to boot the Operating System. To move a device, first select it with the up-or-down arrows, and move it up or down using the <+> and <-> keys.

⚠ CAUTION

When more than one hard drive or removable drive is used, use the boot order list to specify the drive to be used from the sub menu. For more details on this, refer to the next page.

Exit Menu

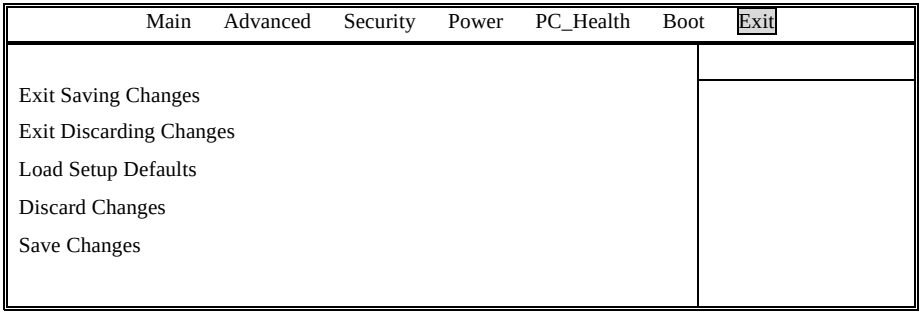


Figure 4.20. Exit Menu Window

The following sections describe each of the options on this menu. Note that <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Exit Saving Changes

After making your selections on the Setup menus, always select either "Saving Values" or "Save Changes." Both procedures store the selections displayed in the menus in CMOS (short for "battery-backed CMOS RAM") a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS.

Once the selections are saved, the following message will appear :

Values have been saved to CMOS!
Press <space> to continue

If you attempt to exit without saving, the program asks if you want to save before exiting.

During boot up, PhoenixBIOS attempts to load the values saved in CMOS. If those values cause the system boot to fail, reboot and press <F2> to enter Setup. In Setup, you can get the Default Values (as described below) or try to change the selections that caused the boot to fail.

Exit Discarding Changes

If, during a Setup Session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.

If you select “Discard Changes” in the Exit Menu, all the selections will be updated and the following message will appear :

CMOS values have been loaded!
Press <space> to continue.

Load Setup Defaults

To display the default values for all the Setup menus, select "Load Setup Defaults" from the Main Menu. It displays these messages:

```
ROM Default values have been loaded!
Press <space> to continue
```

If, during boot up, the BIOS program detects a problem in the integrity of values stored in CMOS, it displays these messages:

```
System CMOS checksum bad - run SETUP
Press <F1> to resume,    <F2> to Setup
```

The CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press <F1> to resume the boot or <F2> to run Setup with the ROM default values already loaded into the menus. You can make other changes before saving the values to CMOS.

Discard Changes

Restore the contents saved previously to CMOS.

Save Changes

Selecting “Save Changes” saves all the selections without exiting Setup. You can return to the other menus if you want to review and change your selections.

5. Specifications

Specifications

Table 5.1. Functional Specifications (1/2)

Item		CPU-SB303-FIT	CPU-SB303-FIT-3F	CPU-SB304-FIT-400	CPU-SB304-FIT-45F
CPU		Ultra Low Voltage Intel(R) Celeron(R) M Processor 800MHz(FSB400MHz)		Ultra Low Voltage Intel(R) Celeron(R) M Processor 1GHz(FSB400MHz)	
Chip Set		Intel(R) 852GM + ICH4			
Memory	L2 Cache	None			
	Main Memory	512MB, 200-pin SO-DIMM socket x 1, PC2100(DDR266) DDR SDRAM			
	BIOS ROM	4MB			
Video	Controller	Built-in Intel 852GM			
	Video RAM	Using main memory (64Mbyte Max.)			
	Video BIOS	48KB(C0000H - CBFFFF)			
	Display I/F	Analog RGB I/F x 1 (15-pin HD-SUB connector x 1)			
System resolution *1		640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 600, 1280 x 720, 1280 x 960, 1280 x 1024, 1400 x 1050, 1600 x 900, 1600 x 1200, 1856 x 1392, 1920 x 1080, 1920 x 1200 (16,770,000 colors), 1920 x 1440 (65,536 colors)			
Audio		Output : Line OUT x 1 (Stereo output level 8Ω 200mW Signal to Noise ratio 90dB), Input : MIC x 1 (Monaural), Plug type : ϕ3.5 pin JACK			
CF card slot		CF CARD Type I, II x 1 (Primary IDE Master)			
		None	Finished mounting CF (2GB, 1 partition)	None	Finished mounting CF (2GB, 1 partition)
Secondary IDE		Equipped with the dedicated 40-pin half pitch connector (Connects the CD-ROM/DVD-ROM drive) (Bottom side)			
Serial I/F		RS-232C (General purpose) : 2 channels, 9-pin D-SUB connector Baud rate : 50 - 115,200bps			
LAN1	I/F	Ethernet 100BASE-TX/10BASE-T RJ-45 connector			
	Controller	Built-in Intel ICH4			
LAN2 *7	I/F	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector			
	Controller	Intel 82541PI			
USB I/F		4 channels (USB 2.0 compliant [High/Full/Low Speed] compliant)			
Keyboard / Mouse I/F		None *2			
F&eIT I/F		It can be accommodated up to 8 F&eIT series device modules. *3 *4 (The total power for externally connected units should not exceed 3.0 A)			
Watch dog timer		1 - 255sec, 255 level, When timing up : reset			
Hardware monitoring		Monitoring of the CPU and board for the temperature and power supply voltage at a single location each			
RTC/CMOS		Life of lithium backup battery : When no power supplied, When power supplied : 10 years or more (25°C) Accuracy of realtime clock : less than 3 min./month (25°C)			
LED Display		Power, CompactFlash access, user programmable LED x 2			

*1 : To display in the resolution more than [1400 x 1050], you need to change[Internal DDC ROM] of[Video Features]in BIOS setting to [Disabled].

*2 : For the keyboard / mouse / FDD, use the USB I/F.

*3 : Ensure that the sum of the maximum current consumptions for each unit does not exceed the current output of the power supply unit.

*4 : The stack connector supplies the power to device modules. Note that the maximum allowable current of the stack connector is 3.0A.

Table 5.1. Functional Specifications (2/2)

Item		Description
Manual switch input		Reset switch x 1, user programmable switch x 1
Power supply	Input power voltage	12 - 24VDC±5%
	Max. power consumption	When inputting 12V : 2.4A, When inputting 24V : 1.3A
	External device power supply capacity	- Secondary IDE connector +5V : 500mA - CF card slot +3.3V : 500mA - USB I/F +5V : 2A (500mA x 4)
Physical dimension (mm)		94.0(W) x 120.0(D) x 74.7(H) (No protrusions)
Weight		800g (When mounting the DIN rail installation metal fittings 900g)

Table 5.2. Installation environment

Item		Description
Operating temperature *5 *7		0 - 50°C
Storage temperature		-10 - 60°C
Operating Humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-Noise resistance	Line-noise *6	AC line / 2kV, Signal line / 1kV (IEC1000-4-4Level 3, EN61000-4-4Level 3)
	Static electricity resistance	Contact discharge / 4kV (IEC1000-4-2Level 2, EN61000-4-2Level 2)
		Atmospheric discharge / 8kV (IEC1000-4-2Level 3, EN61000-4-2Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm, 57 - 150Hz / 2.0G
		40minutes each in X, Y, and Z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
Impact resistance		15G, half-sine shock for 11ms in X, Y, and Z directions (JIS C60068-2-27-compliant, IEC60068-2-27-compliant)
Grounding		Class D grounding (previous class 3 grounding)

*5 : If this product is installed with the heat sink side up, use it in the environment that has cooling air (0.5m/s).

*6 : When PBA75F-24 (manufactured by Cosel) is used for the AC-DC power supply unit.

*7 : In case of CPU-SB304, range of operating guarantee temperature is 0 - 35°C when connecting the 1000BASE-T. If you use it in the range of 35 - 50°C, set it to 100BASE-TX or 10BASE-T.

About power supply

Please use the power supply in which the boot time up to 7.2V is equal to or under 25ms.

For the required capacity, see below.

Input 12VDC

	V	A	W
Main unit	12	2.4	28.8
Secondary IDE	5	0.5	2.5
CF Slot	3.3	0.5	1.65
USB	5	2	10
F&eIT BUS	5	3	15
			Total 57.95 *1*3

Input 24VDC

	V	A	W
Main unit	24	1.3	31.2
Secondary IDE	5	0.5	2.5
CF Slot	3.3	0.5	1.65
USB	5	2	10
F&eIT BUS	5	3	15
			Total 60.35 *2*3

*1： When the F&eIT BUS is not used (for single use), it is 42.95W.

*2： When the F&eIT BUS is not used (for single use), it is 45.35W.

*3： Power capacity tempers with the margin 10%, and it is recommended to use the power supply of 70W or more. When using the controller unit for single use, it is recommended to use the power supply of 50W or more. DIN rail-connectable power supply is as follows：

Maker	Model type	Power capacity	Power type
DENSEI-LAMBDA	DLP75-24-1	75W	DIN rail-connectable
IDEC	PS5R-SD24	60W	DIN rail-connectable
OMRON	S8VS-06024	60W	DIN rail-connectable

System Configuration

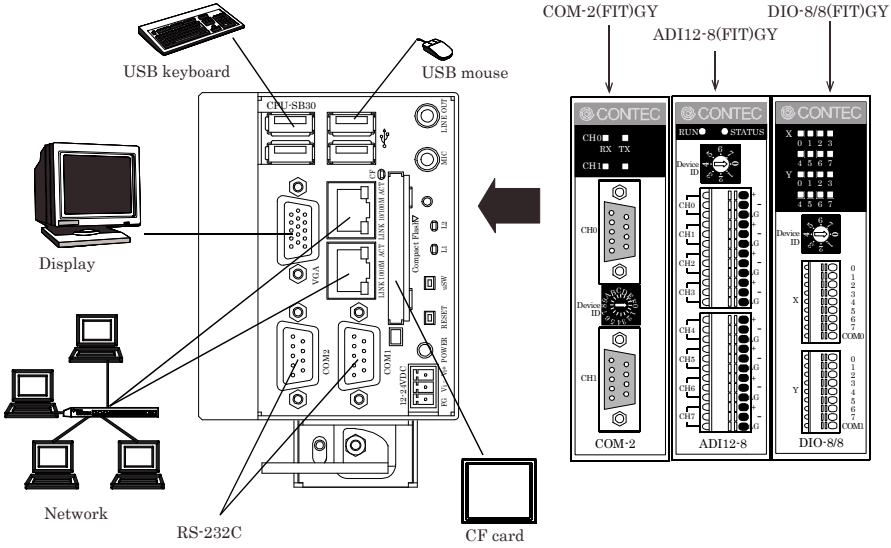


Figure 5.1. System configuration diagram

Physical Dimensions

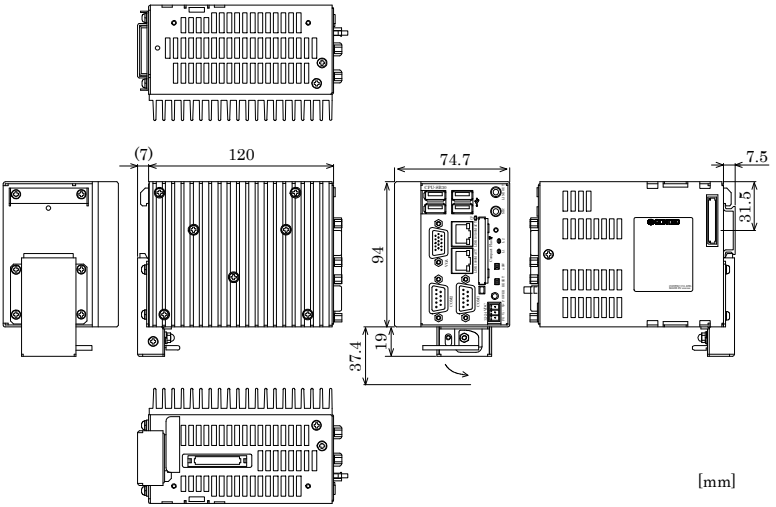


Figure 5.2. Physical Dimensions (When mounting the DIN rail installation metal fittings)

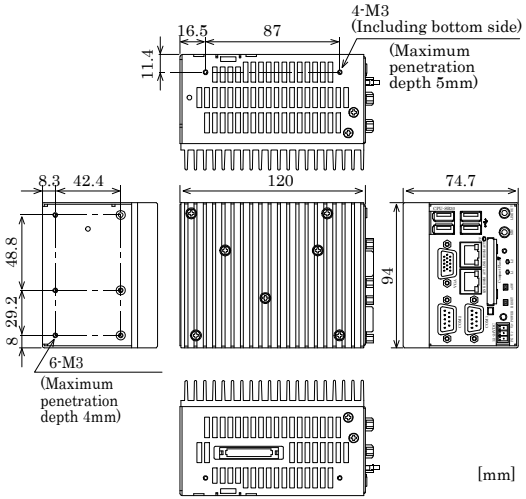


Figure 5.3. Physical Dimensions (including screw hole dimensions)

⚠ CAUTION

The screw holes are located at the top and back of this product. Metal fittings for installing this product directly onto a wall or other surface are not bundled nor provided as optional products. When using these screw holes to install the product, make your own assessment and supply such fittings yourself.

6. Appendix

Watchdog Timer (WDT) Setting

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there is heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.

The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system. This feature allows a running program to restart in an orderly way when a power glitch or any abnormal condition occurs.

The watchdog timer comes with 255-level time-out interval, 1 - 255 seconds per interval, which can be adjusted by software setting. There is a tolerance of 2 second for this time-out interval. To maintain the normal system operation, trigger the timer periodically by the user-created program in consideration of the tolerance.

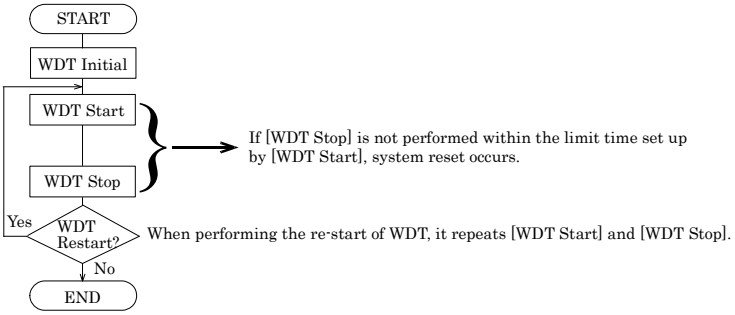
The CD-ROM [F&eIT Series Setup Disk], which is bundled with this product, contains a sample program for the watchdog timer.
To see the sample program for the watchdog timer, decompress "HWMandRTCut.zip" in \APISBP\SB30\Utility\Samples\Module.

Ex.) If the time-out interval is set to 30 seconds, the user-created program must retrigger the watchdog timer before 28 seconds will have elapsed in consideration of the tolerance. If the program failed to retrigger the timer (if 28 - 32 seconds have elapsed), the system will automatically reboot.

The I/O port is defined at address 2e/2fH. You can trigger/enable disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart


START
WDT Initial
WDT Start
WDT Stop
If [WDT Stop] is not performed within the limit time set up by [WDT Start], system reset occurs.
Yes
WDT Restart?
When performing the re-start of WDT, it repeats [WDT Start] and [WDT Stop].
No
END

* It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;================
;<WDT Initial>
;================
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------
;Set WDT function at pin89
;-------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
MOV AL,0DH
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------------------
;Activate logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,01H
OUT DX,AL
;-------------------------------------
;Set timer unit : second
;-------------------------------------
MOV DX,2EH
MOV AL,F5H
OUT DX,AL
MOV DX,2FH
```

```
MOV AL,00H
OUT DX,AL
;-----------------------------------------
;Exit the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;================================
;<WDT START : counter set and a start >
;================================
;-----------------------------------------------
;Enter the extended function mode
;-----------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;---------------------------------------------------------
;Set time of WDT and start to count down
;---------------------------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.- FFH=255sec.)
MOV AL,0FH      ; 0FH = 15Sec.
;-------------------------------------------------------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

```
;==============
;<WDT STOP>
;==============
;-----------------------------------
;Enter the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------
;Select logical device WDT(number 8)
;-----------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------
;Stop count down of WDT
;-----------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-----------------------------------
;The data of 00H is stop WDT
MOV AL,00H
;-----------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

⚠ CAUTION

The timer's intervals have a tolerance of ±2 seconds.

Hardware Monitor

Hardware Monitor function is included in Hardware Monitor controller (Winbond W83627HG) on this product.

You can read Temperature, Voltage of this product.

The CD-ROM [F&eIT Series Setup Disk], which is bundled with this product, contains a hardware monitoring utility. To use the bundled hardware monitoring utility, execute “setup.exe” in \APISBP\SB30\Utility\MTRAS\Disk1, and install “CONTEC Hardware Monitor”. (Check the CONTEC’s Web site (http://www.contec.com/fit/page15.htm) for more information on the latest F&eIT Series Setup Disk.)

Temperature

Two Thermistors are mounted on this product as following. You can read Temperature of this position.

Voltage

You can read 3.3V, +5V, VTT (1.5V), Vcore of this product.

VTT(1.5V) : CPU I/O voltage

Vcore : CPU core voltage

Q&A

Common to CPU-SB30 Series

Q. Can I use a bootable CF created on a different PC and CF used by CPU-SB10 series, CPU-SB20 series?

A. The setting BPB required for disk access (the BIOS parameter block) differ depending on the BIOS manufacturer and these are written to the CF when it is formatted. For this reason, you cannot typically use a CF from another PC.
In addition, to use a CF on CPU-SB30 series, you must format it on CPU-SB30 series and also install an OS.

Q. What should I use for the power supply?

A. You can also use any competitor's product (output : 12V - 24VDC) sold on the market.
When determining the wiring layout, refer to the "Connection Procedure" in Chapter 2 and take note of the cable size and length restrictions for both the power supply and other cables.
For more details on the power supply, refer to "Chapter5 Specifications - About power supply".

Q. Battery replacement

A. For clock and CMOS backup battery replacement, contact your retailer

Q. OS's (operating systems) for which operation has been confirmed and an example of their installation procedures

A. The operation of the following OS's has been confirmed :
- IBM PC DOS 2000 Version 7.0E
- Microsoft Windows XP Professional / 2000 Professional
- TurboLinux 10 Server (Linux 2.6.8-1 kernel)

* An example of the installation procedures is included in the SB30 folder for API-SBP(W32) Jun.2007 or later version.

Q. Can I add more memory?

A. No. You cannot add extra memory.

Q. Is there an auto power-off function that allows the device to switch off automatically after an OS such as Windows shuts down?

A. No. The power cannot be turned off automatically due to the specifications of the AT power supply.
However, if you use a UPS with an auto power-off function, you can let the device turn off automatically.
Please note that we do not provide any UPS operational information.

Q. Can I use any commercial CD-ROM drive?

A As the IDE connector has a special shape, please use our optional CD-ROM/DVD-ROM drive (connect the optional CD-ROM/DVD-ROM drive (IPC-CDD-03) to the IDE cable (IPC-CDC-03)), which is designed specifically for this.

Q. Should I note it with ON/OFF of the power supply?

A. After turning off the power, wait for at least five seconds before turning it back on.
If the power is turned on immediately after being turned off, the product may malfunction.

Q.Is it possible to display in the maximum resolution?

A. To display in the resolution more than [1400 x 1050], you need to change[Internal DDC ROM] of[Video Features]in BIOS setting to [Disabled].

Q.Nothing is displayed on the screen?

A. When you boot this product in the situation that [Internal DDC ROM] of [Video Features] in BIOS setting is [Disabled] and the monitor cable is disconnected, the screen is not displayed. To display the screen, press [Ctrl], [Alt], and [F1] keys.

Q. On rare occasions, Windows does not boot when USB device is connected?

A. When USB device is connected and Legacy USB Support in BIOS setting is Enable (default), Windows might not be able to boot on rare occasions. When Legacy USB function is Disable, this event does not happen since this is caused by Legacy USB function. If this event happens, make Legacy USB support in BIOS setting Disable. Setting of Legacy USB Support is supported from BIOS Ver.1.11 and later. If the version is equal to or under BIOS Ver.1.10, you need to upgrade BIOS.
Please contact your retailer for the BIOS upgrade.

For CPU-SB303-FIT, CPU-SB304-FIT-400 only

Q. Do you have a list of operating systems for which operation has been confirmed?

A. A list is posted on the CONTEC web site at http://www.contec.com/fit/. Please download the latest drivers from the web site. As documents including important notes on the use of the module are also posted on the web site, please visit the CONTEC web site before using the module.

Q. Which brands of CF can I use?

A. The requirement is that the CF supports True IDE mode. As some low price brands of CompactFlash do not support True IDE mode, please check with the manufacturer or agent before purchasing. CONTEC recommends you use CF made by Transcend Corporation.

The operation of the following CF's has been tested on CPU-SB30 series :

Transcend	1GB(TS1GCF45I-D, TS1GCF100I)
Transcend	2GB(TS2GCF45I-D, TS2GCF100I)
Transcend	4GB(TS4GCF45I-D, TS4GCF100I)
Transcend	8GB(TS8GCF45I-D, TS8GCF100I)

Q. How can I install an OS in a CF card?

A. You can install using a USB CD-ROM drive or USB connected FDD.
For more details on this, refer to “USB ports” in “Chapter3 Functions of the Various Components” - “Nomenclature” or “CPU-SB303-FIT OS installation procedure” in the bundled CD-ROM [F&eIT Series Setup Disk].
(Check the CONTEC’s Web site (http://www.contec.com/fit/page15.htm) for more information on the latest F&eIT Series Setup Disk.)

For CPU-SB303-FIT-3F, CPU-SB304-FIT-45F only

Q. Can I install to CPU-SB303-FIT-3F, CPU-SB304-FIT-45F and use an application which was used by
CPU-SB21/256(FIT)GY or CPU-SB22/256(FIT)GY?

A. Yes. You can use a development application that uses API-SBP(W32) supported by CPU-SB30 series. It should however be noted that the application processing speed may change due to differences in the hardware specifications such as CPU. If the speed change impacts the operation, make some adjustments such as for the application processing method.
In addition, please run the actual program to check its operation in order to find out how big the change actually is. If you are going to use an application that was developed with API-SBP(W32), which is not supported by CPU-SB30 series, please use the May-2007 or later version after rebuilding it.

Q. How long does it take for CPU-SB303-FIT-3F, CPU-SB304-FIT-45F to boot up after the power is turned on?

A. It takes approximately 50-60 seconds, when no application is installed. The boot time includes the time needed for icons to appear.

Q. Is there any way to recover Windows XP Embedded on CPU-SB303-FIT-3F, CPU-SB304-FIT-45F?

A. It can be recovered by using the bundled recovery CD either in a USB-based CD/DVD-ROM drive or Secondary-IDE-based CD-ROM/DVD-ROM drive (connect the optional CD-ROM/DVD-ROM drive (IPC-CDD-03) to the IDE cable (IPC-CDC-03)). Please provide necessary equipment yourself according to the CD-ROM/DVD-ROM to be used.
For details of the recovery operation, please read the bundled “Pre-installed OS Recovery Procedures”.

Q. What is the drive configuration and how big is the capacity at the time of OS pre-installation?

A. The drive configuration only takes one drive (one partition). Consequently, only the C drive is available for a CF.
CPU-SB21(FIT)GY/CPU-SB22(FIT)GY has a single-drive (two partitions) configuration.

The capacities are as follows :

	Partition	capacity	Used area	Free space
CPU-SB303-FIT-3F, CPU-SB304-FIT-45F Windows XP Embedded(sp2) CF 2GB	C drive (NTFS)	1.89GB	683MB	1.22GB
	EWF partition	6MB	6MB	None

* The capacities are current as of July 2007. They may be changed in the future.

* "EWF partition" refers to a management area partition designed for use of the Embedded Write Filter function in the XP Embedded pre-installed model.
Remarks :

- The user is not allowed to make partition changes.
(CONTEC cannot provide the user with any information regarding whether or not his partitioning tool can create partitions, as such information is not available. Please note that if the user makes any partition change, CONTEC shall not guarantee the operation.
- If the EWF function is "Enabled", data cannot be written to the C drive. Therefore, please use a USB memory device or file server to save data such as logs.

Difference from CPU-SB20/xxx(FIT)GY

CPU-SB30 series is more advanced than the CPU-SB20/xxx(FIT)GY Series and comes with a high-speed CPU. This product is different in specifications, it is as follows :

CPU-SB20/xxx(FIT)GY Series : CPU-SB22/256(FIT), CPU-SB21/256(FIT)GY, CPU-SB20/256(FIT)GY, CPU-SB20/128(FIT)GY

Item	CPU-SB30 series	CPU-SB22/256(FIT)/CPU-SB21/256(FIT)GY/ CPU-SB20/256(FIT)GY/CPU-SB20/128(FIT)GY
CPU	Ultra Low Voltage Intel(R) Celeron(R) M Processor 800MHz, 1GHz (FSB400MHz)	Geode SC2200 266MHz
Chipset	Intel(R) 852GM+ICH4	Built-in CPU
Memory	512MB, 200-pin SO-DIMM socket x 1, PC2100(DDR266) DDR SDRAM	Micro-DIMM socket x 1, CPU-SB22/256(FIT) / CPU-SB21/256(FIT)GY / CPU-SB20/256(FIT)GY : Coming standard with 256Mbyte Micro-DIMM CPU-SB20/128(FIT)GY : Coming standard with 128Mbyte Micro-DIMM
Video	Built-in Intel 852GM, 15-pin HD-SUB connector, 640 x 480, 800 x 600, 1152 x 864, 1280 x 600, 1280 x 720, 1280 x 960, 1024 x 768, 1280 x 1024, 1400 x 1050, 1600 x 900, 1600 x 1200, 1856 x 1392, 1920 x 1080, 1920 x 1200 (16,770,000 colors), 1920 x 1440 (65,536 colors)	Built-in CPU, 15-pin HD-SUB connector, 640 x 480 / 800 x 600 (65,536 colors), 1024 x 768 (65,536 colors), 1280 x 1024 (256 colors)
LAN I/F	Ethernet 100BASE-TX/10BASE-T RJ-45 connector (Built-in Intel ICH4), Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector (Intel 82541PI)	Ethernet 100BASE-TX/10BASE-T RJ-45 connector DP83815 or DP83816 (National Semiconductor)
USB I/F	4 channels (USB 2.0 compliant [High/Full/Low Speed] compliant)	2 channels (OHCI Ver.1.0 compliant)
Keyboard I/F	None	PS/2 type keyboard (6-pin MINI DIN connector)
Mouse I/F	None	PS/2 type mouse (6-pin MINI DIN connector)
Watch dog timer function	1 - 255sec, 255 level, When timing up : reset	Programmable (16666sec(Max.)) (Reset or output to IRQ when time is reached)
Secondary IDE	Equipped with the dedicated 40-pin half pitch connector (Connects the CD-ROM/DVD-ROM drive) (Bottom side)	None
RTC/CMOS	Life of lithium backup battery : When no power supplied, When power supplied : 10 years or more (25°C) Accuracy of realtime clock : less than 3 min./month (25°C)	Life of lithium backup battery : 6 years or more (25°C) Accuracy of realtime clock : less than 3 min./month
Power supply	12 - 24VDC±5% 31.2W	5VDC±5% 7.5W
Physical dimensions (mm)	74.7(W) x 120.0(D) x 94.0(H) (installed vertically)	52.4(W) x 64.7(D) x 94.0(H)
Weight	800g (When mounting the DIN rail installation metal fittings 900g)	300g

Item	CPU-SB30 series	CPU-SB22/256(FIT)/CPU-SB21/256(FIT)GY/ CPU-SB20/256(FIT)GY/CPU-SB20/128(FIT)GY
Verified Operating Systems *1	Microsoft Windows XP Professional, Embedded Microsoft Windows 2000 Professional IBM PC-DOS 2000 Ver.7.0 TurboLinux 10Server (2.6.8-1 kernel)	Microsoft Windows XP Professional, Embedded Microsoft Windows 2000 Professional Microsoft Windows Me Microsoft Windows 98 SE IBM PC-DOS 2000 Ver.7.0 Linux 2.4.17 kernel

*1 Verified Operating Systems : Basic OS operation, VGA, LAN and sound driver operation has been confirmed. CONTEC does not guarantee that all OS functions will operate correctly.

Differences other than the specification are as follows :

- Restoring OS (embedded system) and installing OS are easy by equipping with the secondary IDE.
- CF eject button is provided.
- CF card retaining mechanism is available.
- The DIN rail installation part can be removed.
- The screw holes on the cabinet allow this product to be mounted on a wall using a jig without a DIN rail.

Precautions when Replacing CPU-SB20/xxx(FIT)GY with This Product

Hardware

- The physical dimensions (shape), weight, input power supply voltage and device module connection method differ between the two products.
  Also, the PS/2 keyboard and mouse cannot be used. Use both the keyboard and mouse for USB.
- The CF card used for CPU-SB2x cannot be used for this product, if the card is simply inserted to it.

Software

- The watchdog setting method differs.
- For the CPU-SB30 series, the Windows XP Embedded pre-installed model has a single-partition configuration. Therefore, if the EWF function is enabled, data cannot be saved to a CF. For that reason, save any data which you need to save using storage such as a USB memory device and network server.

Difference from CPU-SB303-FIT Series

CPU ability is raised more higher than the existing product CPU-SB303-FIT (clock is changed 800MHz to 1GHz). There is a difference between CPU-SB303and CPU-SB 304 in specifications.

Item	CPU-SB303	CPU-SB304
CPU	Ultra Low Voltage Intel(R) Celeron(R) M Processor 800MHz(FSB400MHz)	Ultra Low Voltage Intel(R) Celeron(R) M Processor 1GHz(FSB400MHz)

CPU-SB30x-FIT Series

User's Manual

CONTEC CO.,LTD.

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3-9-31, Himesato, Nishiyodogawa-ku, Osaka 555-0025, Japan
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